ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXI. No. 3377. AUGUST 14, 1942 6d. WEEKLY

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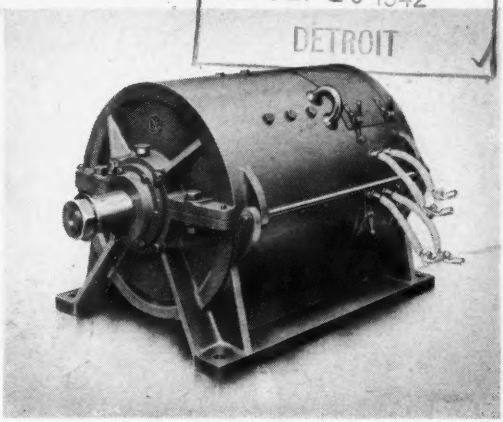
DETROIT

A TOUGH MEMBER OF THE L.S.E. FAMILY



The L.S.E. mill-type D.C. motor is built for exceptional duties. Mechanically and electrically it is a husky job. Features include "Steel Frame" construction, dust-proof armature, heat-treated commutator, flexible roller bearings of traction type (or sleeve bearings of large diameter and length, if preferred), etc. The frame is split and hinges on either side; and normally the machine is reversible about the centre line.

There is also in the large L.S.E. family a semi-mill-type motor that is the happy medium between industrial and full mill type for a number of applications.

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Specialist Makers of Electric Motors for nearly 60 Years

NORWICH, MANCHESTER, LONDON & BRANCHES

Our Technical Service is available on any matters connected with S.C.A. conductors and related hardware.

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CO. LTD

HEAD OFFICE: OAKLEY MANOR, BELLE VUE, SHREWSBURY, SHROPSHIRE
Telephone: Shrewsbury 4481 Telegrams: Cryolite, Shrewsbury

P.51. E.R. 14.8.42

HEATRAE

ELECTRIC WATER HEATERS

It was Francis Thompson who said that "All the Past, read True, is Prophecy." The progress of Heatrae in the past—and at present—seems to indicate the Poet's assertion.

HEATRAE LTD NORWICH GRAMS "HEATRAE" NORWICH PHONE NORWICH 25131

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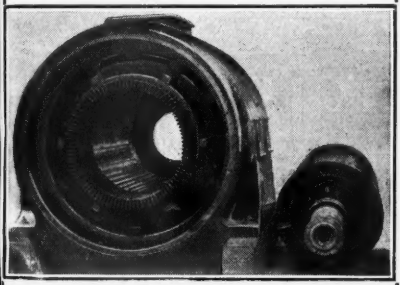
The WESTMINSTER ENG. Co. Ltd.

Victoria Road, Willesden Junction, N.W.10



1500 kVA Turbo Generator Stator and Rotor Entirely Rewound

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Suitable for Telephone Lines.

FOR CABLES AND WIRES OF ALL KINDS

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to the specific requirements of our customers.

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BROTHERS LIMITED
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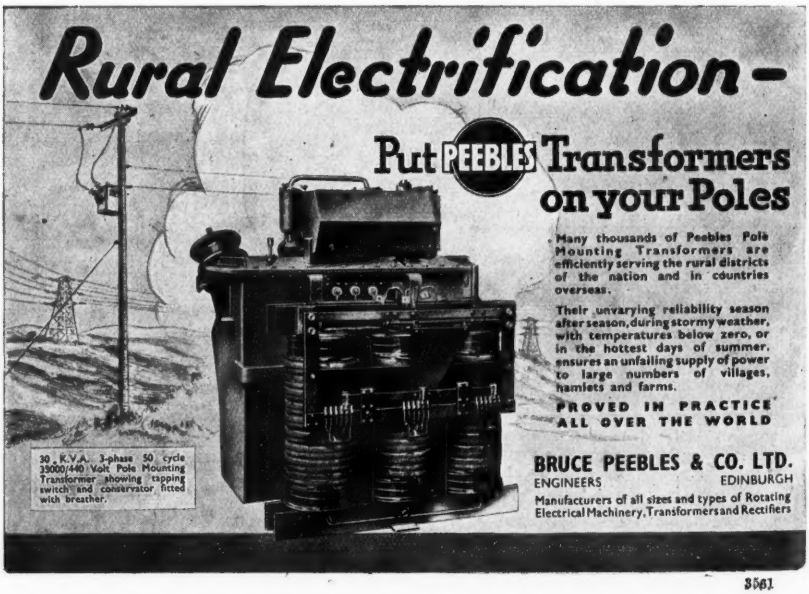
The Makers of *"Tank" Brand* Non-Ferrous Metal Alloys, including :— Extruded Brass and Bronze Rods and Sections, Brass and Bronze Stampings, Gun Metal and Phosphor Bronze Ingots, Chill Cast Gunmetal and Phosphor Bronze Bars and Terne Metal and Cupro Nickel Ingots and Granules, regret their inability to satisfy all the requirements of clients for their products for the time being.

However, the complete satisfaction of clients, old and new, is their chief concern, and when Peace returns to the World again, they will strive to satisfy all, and prove to new friends that their products are second to none. They are grateful for the understanding and forbearance already shown to them in these difficult times.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PROVED IN PRACTICE ALL OVER THE WORLD
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BRUCE PEEBLES & CO. LTD.
ENGINEERS EDINBURGH
Manufacturers of all sizes and types of Rotating Electrical Machinery, Transformers and Rectifiers

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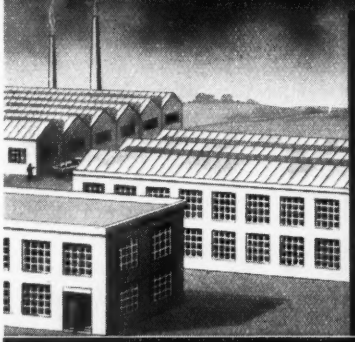
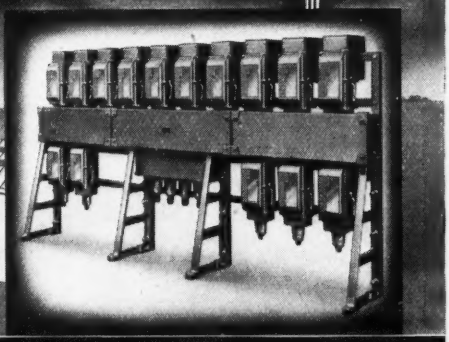
MAIN CONTROL GEAR
for all factories

BILL





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"BILSWITCH" BIRMINGHAM

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The ELLIOTT
PRESSURE TRANSMITTER
FOR THE REMOTE INDICATION . . . AND RECORDING OF PRESSURE OR DRAUGHT

This application of the Elliott Transmission System is particularly suitable for measuring low pressure or draught, and the type of gauge employed, combines the advantages of . . . **high sensitivity, rapid action, absence of liquids and mechanical simplicity . . .** No gearing is employed and the operating mechanism is entirely free from backlash.

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CENTURY WORKS, LEWISHAM, S.E.18

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ELECTRIC MOTOR POLISHERS

A. C. 4 BEARINGS
400 VOLTS, 3 PHASE
50 CYCLES.
1, 2, 3, 4 AND 5 H.P.

DELIVERY—
IMMEDIATELY ON
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TOOL LICENCE AND
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for IMMEDIATE DELIVERY!!

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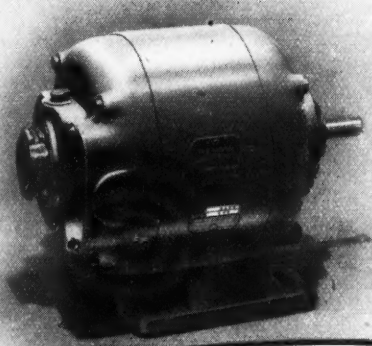
B T-H

FRACTIONAL HORSEPOWER MOTORS



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or
D.C. MACHINES

Any form of mounting

Ball or Sleeve Bearings

The most popular in the country

The BTH Company has always maintained leadership in the design and manufacture of fractional horse-power motors and is executing a large volume of orders.

The Company's engineers are available to give technical advice and assistance, as hitherto, on the choice of electric drive for any application which will assist the national interest.

BTH products include all kinds of electric plant and equipment; and Mazda, Mazda fluorescent, Mercra, and Sodra lamps.

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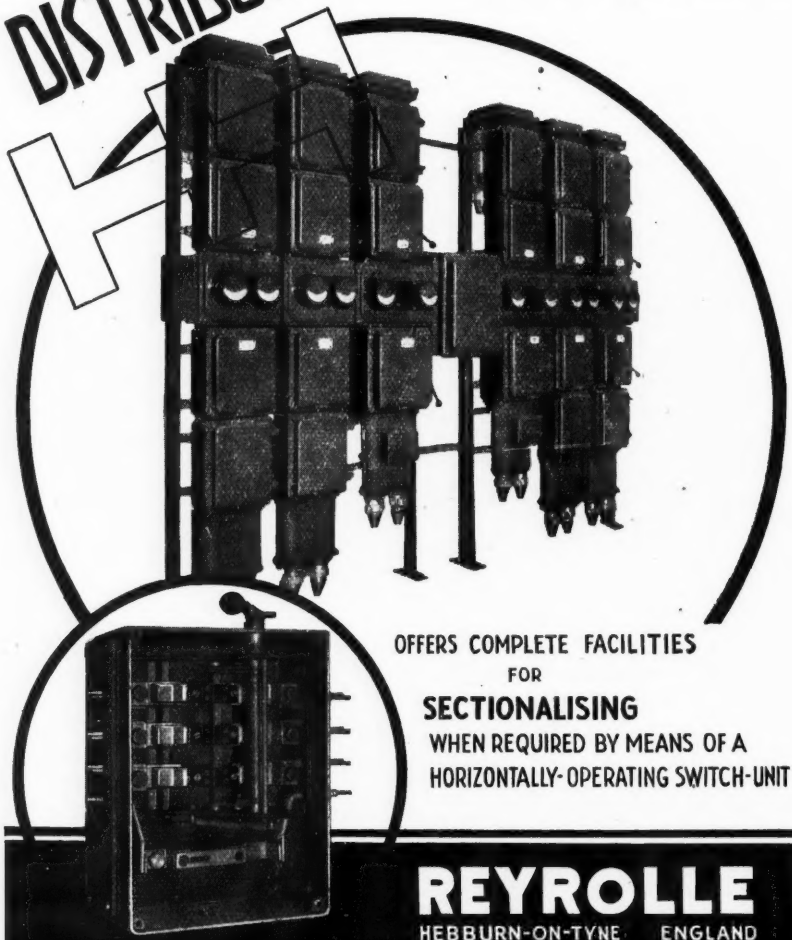
METAL-CLAD

DISTRIBUTION-GEAR

UP TO
1,000 AMPERES AT 660 VOLTS A.C.



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FOR
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WHEN REQUIRED BY MEANS OF A
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HEBBURN-ON-TYNE ENGLAND

THERE IS NO REQUIREMENT THAT IT WILL NOT MEET

Daisy, Daisy, give me your answer, do! If the Farmer asked for the Cow's opinion of the new Gascoigne Pulsator it might well be an expression of greater satisfaction, for now the Gascoigne Pulsator has been re-designed in collaboration with DE LA RUE PLASTICS for production in Plastic material. Below is shown a sectional view of this clever pneumatic Pulsator.

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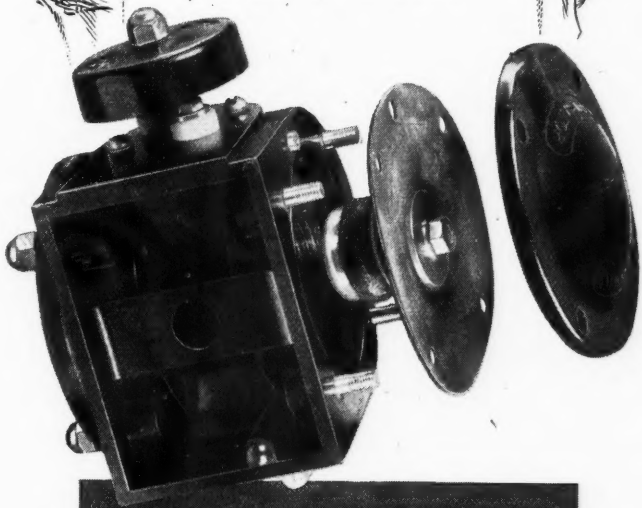

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MEANS
GREATER OUTPUT

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FOR MACHINE TOOL AND BENCH LIGHTING

- Universal movement
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- Protects operators' eyes from glare
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Made in Single-, Two- and Three-arm Extensions

Adopted by many of the Armament and other War Production firms

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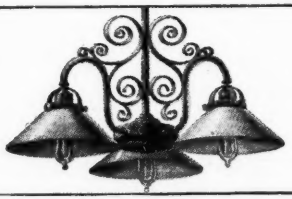
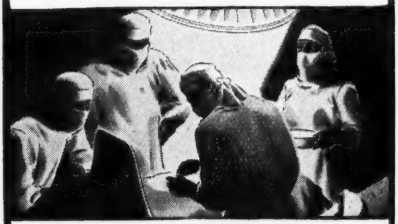
Midland Representative:
W. T. BOWER, 184 Lockey Road, Sutton Coldfield

In 1882 when electric light was a new invention—we pioneered the battery.



Today our batteries protect the lighting of important buildings



In 1882—four years after filament lamps were first introduced—our batteries lit the Royal Mint and other important buildings Today they are predominant for emergency lighting and are widely installed in hospitals, schools, hotels and institutions.

CONTRACTORS specify P & G. & E.P.S. Cells with confidence because of their long record for reliability in Central Stations, Telephone Exchanges—and every other type of installation

EMERGENCY LIGHTING EQUIPMENT

(Licensed under Patent No. 313248). Emergency Lighting Equipment suitable for all types and sizes of installations can be supplied. Details on request.

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Formerly The Electricel Power Storage Co. Ltd —The first battery makers—

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OVER 50 YEARS EXPERIENCE IN BATTERY MANUFACTURE SINCE 1882

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(for commutator bars, brushes, etc.)

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CVS-18

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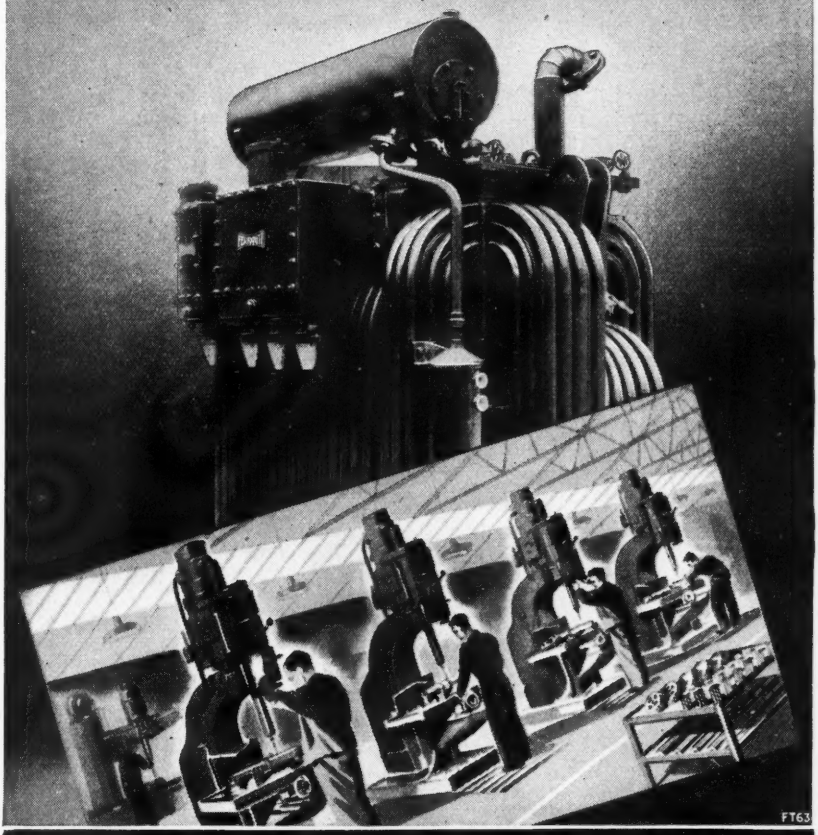

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Transformers

FERRANTI LTD., Hollinwood, LANCS. *London Office: Bush House, Aldwych, W.C.2*

Portrait of a Production Manager who has standardised NECO MOTORS and is taking a war off

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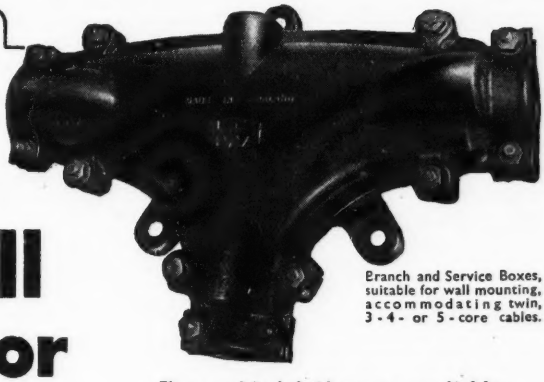
Telephone : MACaulay 3211/4

NECO

Registered Trade Mark

E G.B.49

Cable Boxes for Wall and Floor mounting



Branch and Service Boxes, suitable for wall mounting, accommodating twin, 3-4- or 5-core cables.

These cable joint boxes are suitable for P.I.L.C. and armoured cables for working pressures up to 650 volts. They possess all the special features of design which have proved their worth in the well-known range of HENLEY "Cablegrip" Straight Through, Branch and Service Boxes and as the illustrations show, are provided with robust fixing feet for wall or floor mounting.

Ask for details.

Straight Through Boxes suitable for floor mounting, accommodating single, twin, 3-, 4-, or 5-core cables.

HENLEY

"CABLEGRIP"

STRAIGHT THROUGH, BRANCH and SERVICE BOXES

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.

MILTON COURT · WESTCOTT · DORKING · SURREY

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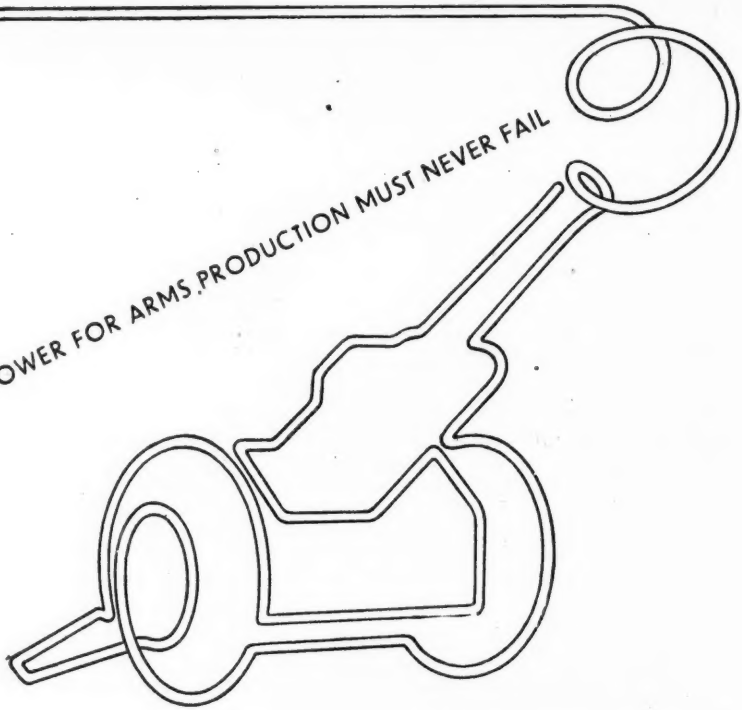
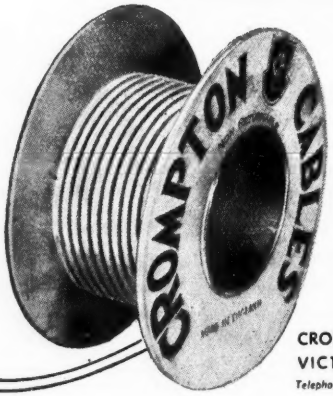


POWER FOR ARMS PRODUCTION MUST NEVER FAIL

SPECIFY **CROMPTON**



V. I. R. CABLE

CROMPTON PARKINSON LTD., ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2

Telephone. TEMPLE BAR 5911 — Telegrams: CROMPARK, ESTRAND, LONDON

The English Electric Company Ltd.

GENERATING PLANT FOR STEAM, WATER, OR OIL POWER

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TRANSMISSION SYSTEMS, SWITCHGEAR, AND CONVERTING PLANT

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STEAM TURBINES.

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DIESEL AND FULLAGAR OIL ENGINES.

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MOTORS AND CONTROL EQUIPMENT FOR RAILWAY OR ROAD VEHICLES.

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TRANSFORMERS OF ANY SIZE, TYPE OR VOLTAGE.

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E.H.T. AND L.T. SWITCHGEAR.

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ELECTRIC COOKERS, WATER HEATERS & FIRES FOR DOMESTIC AND INDUSTRIAL PURPOSES.

STAFFORD

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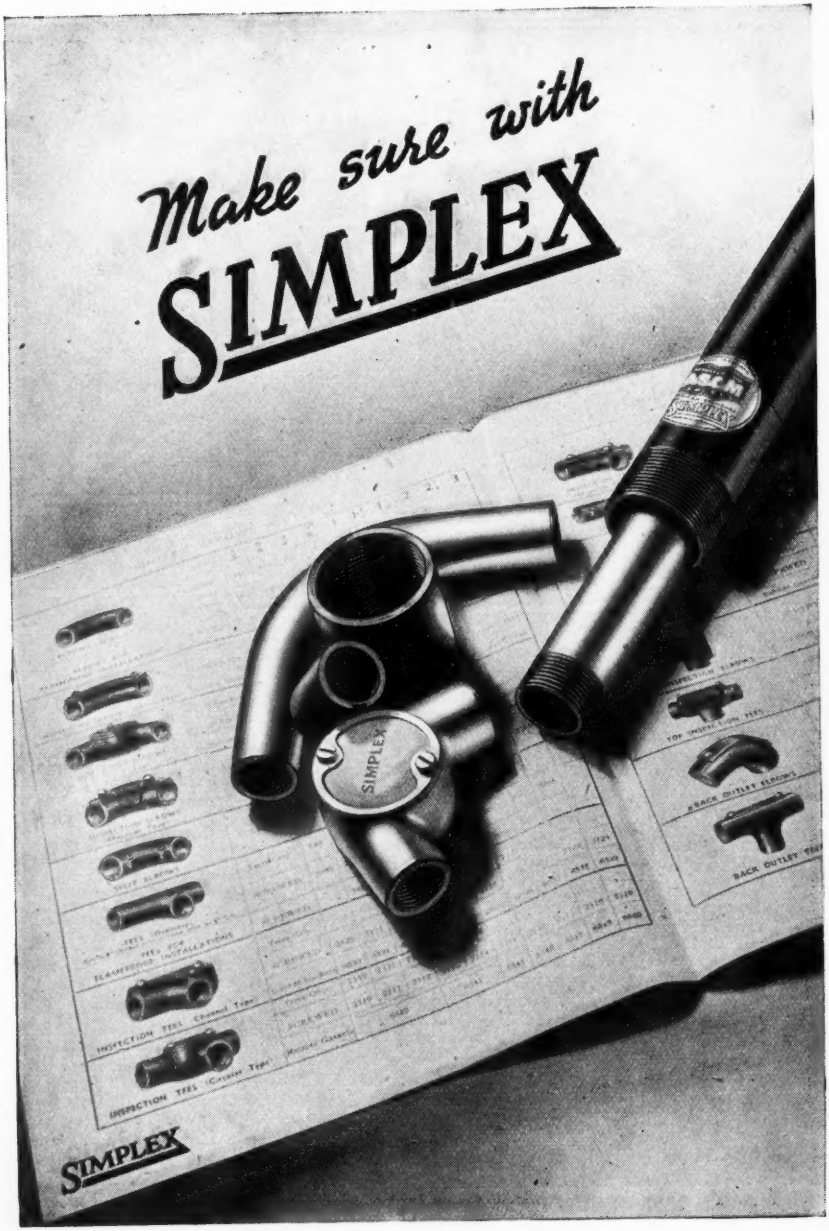
Make sure with
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SIMPLEX
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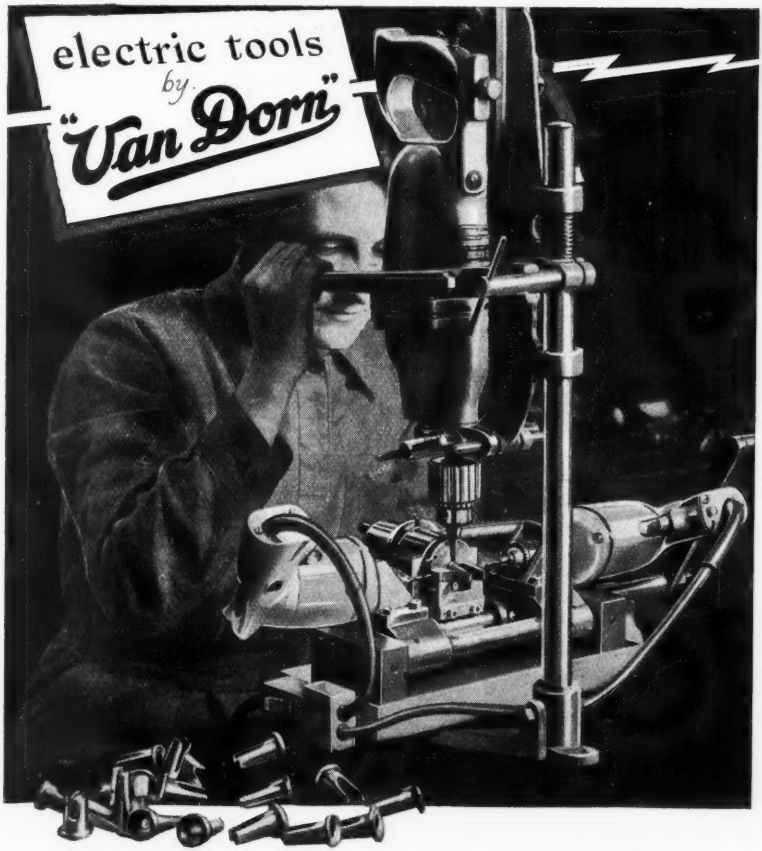


The Tools for Women Workers

Van Dorn Electric Tools, ideal for women workers, are solving production problems and speeding up operations in all branches of industry. They can be successfully incorporated in jigs and fixtures as shown. This set-up uses two Portable Drills lined up horizontally, and one Portable Tapper. Two diametrically opposite holes are drilled simultaneously, the jig indexed twice, and the holes tapped. In this way time is saved and a drill press and a tapper released for other urgent work.

Write for Catalogue No. I.V.37

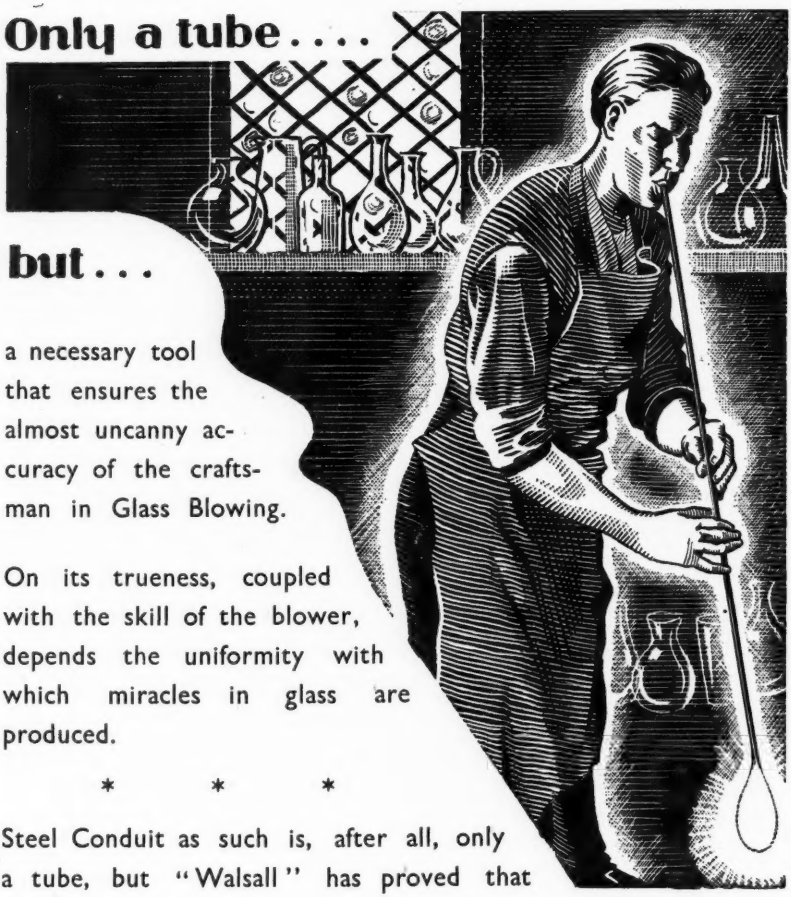
VAN DORN ELECTRIC TOOLS

HARMONDSWORTH, MIDDX. Phone : West Drayton 2681/5

SERVICE CENTRES WITH FACTORY FACILITIES AT BIRMINGHAM, BRISTOL, GLASGOW & MANCHESTER

Smee's

Only a tube....



but...

a necessary tool that ensures the almost uncanny accuracy of the craftsman in Glass Blowing.

On its trueness, coupled with the skill of the blower, depends the uniformity with which miracles in glass are produced.

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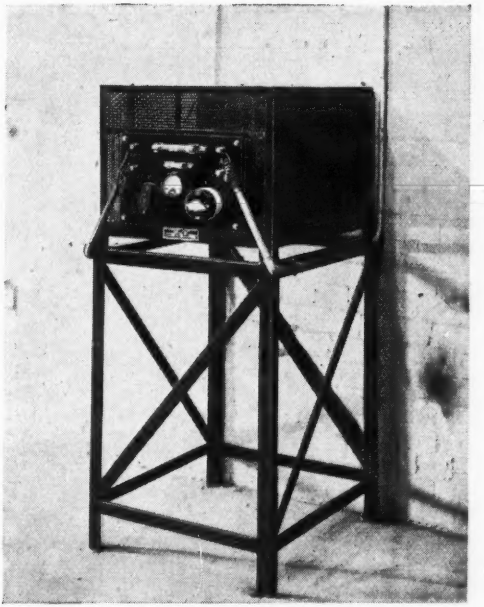
Steel Conduit as such is, after all, only a tube, but "Walsall" has proved that BETTER standards in quality-manufacture bring their own reward in efficiency, durability and—incidentally—REPUTATION

WALSALL CONDUITS LTD · WEST BROMWICH · STAFFS

Reliability proved by long service



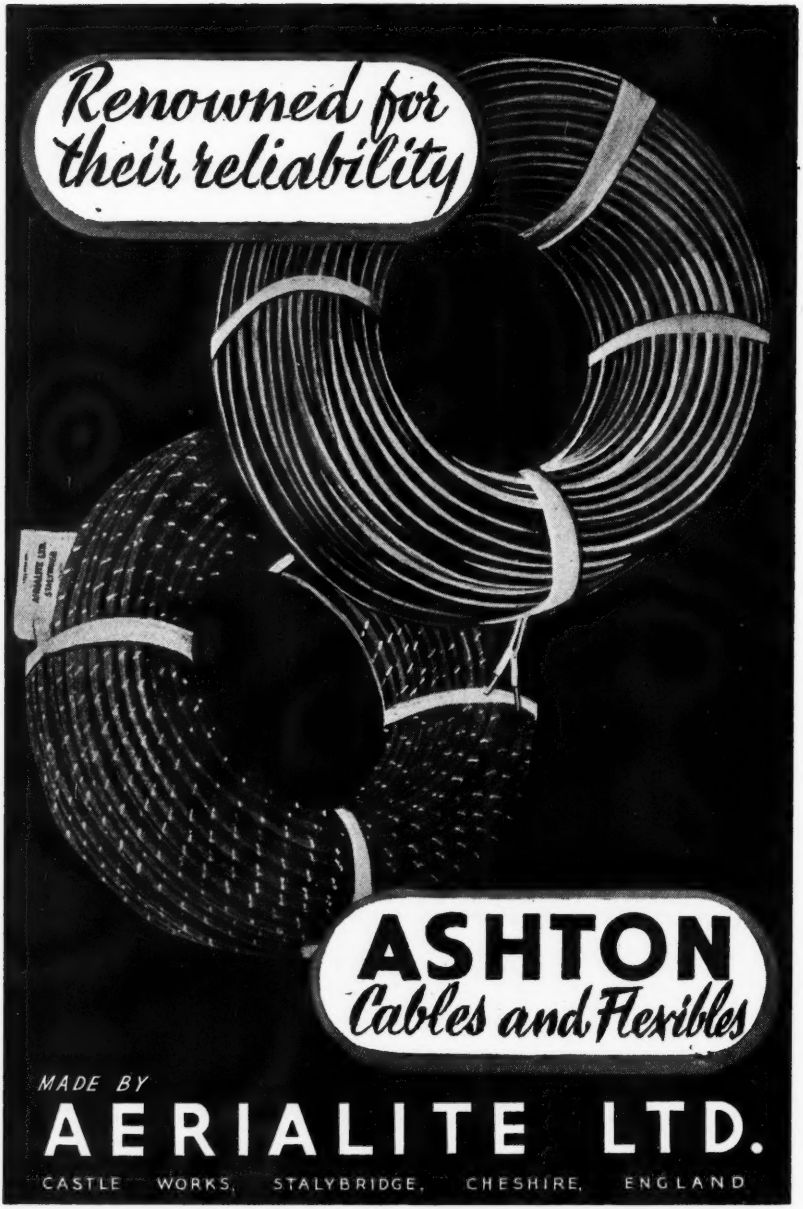
Rectifier equipment for trickle charging a 230-volt emergency lighting battery at 1.5 amps. This set was installed in April, 1930.

Westinghouse COPPER-OXIDE & SELENIUM COMPOUND metal rectifiers

Since their introduction in 1926, Westinghouse Metal Rectifiers have always been known for their outstanding reliability and have contributed many major developments to rectifier technique. To-day, while production has been vastly increased, it is not big enough to meet all demands, but intensive research continues, and the resulting improvements in design and production will be of benefit to all when normal conditions return.

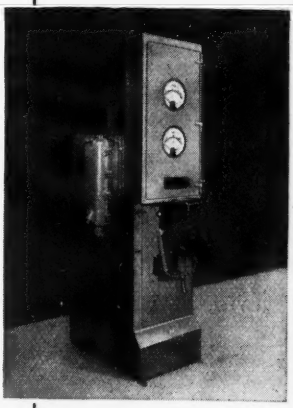
Write for a copy of descriptive pamphlet No. 11 *(price* 1/-*) to* **Dept. E.R.**

WESTINGHOUSE BRAKE & SIGNAL CO. LTD., Pew Hill House Chippenham, Wilts.


Renowned for their reliability
ASHTON
Cables and Flexibles
MADE BY
AERIALITE LTD.
CASTLE WORKS, STALYBRIDGE, CHESHIRE, ENGLAND

Vertical Isolation!

VERTICALLY ISOLATED TYPE VT5 SWITCHGEAR 11 kV 150 MVA



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COSMOS LAMPS *Metrovick's 'light' product*

Vital Industries
No. 5

COAL MINING—

the power behind all British manufacturing industry is proving, to the great benefit of our war effort, that in the past twenty or thirty years many advances have been effected in the methods of production and in the conditions of mining employment.

The electrical industry has played a large part in this development and the progress made in producing better cables for signalling, lighting, coal cutting and conveying, etc. has given greater efficiency and safety to the miner.

LIVERPOOL CABLES

LEC

THE LIVERPOOL ELECTRIC CABLE CO., LTD.
LINACRE LANE, BOOTLE, LIVERPOOL, 20.

CRABTREE AUTOMATIC CONTROL GEAR

Type "A.S.D." Switches

Crabtree triple-pole, oil-immersed "Automatic Star-Delta" switches are operated magnetically and controlled by means of built-in push-buttons. Type "A.S.D." switches can be supplied with or without overload protection, suitable for the control of 3-phase squirrel cage induction motors of up to 43 amperes maximum line current. The changeover from the "Star" to the "Delta" position of the motor phase windings is entirely automatic, although this can be varied on site (by simply turning a small screw) to conform to the acceleration rate of the motor—up to a maximum of 12 seconds.

An additional feature of interest is that the standard type "A.S.D." unit can also be supplied suitably modified for use as a series-parallel starter for controlling 3-phase squirrel cage induction motors of up to 25 amperes. Fusing and isolation facilities are available to meet all normal requirements.

This advertisement does not imply that the products mentioned are necessarily available either in the United Kingdom or for export to any country overseas.

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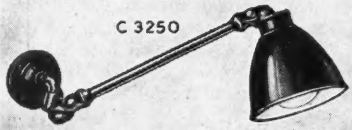

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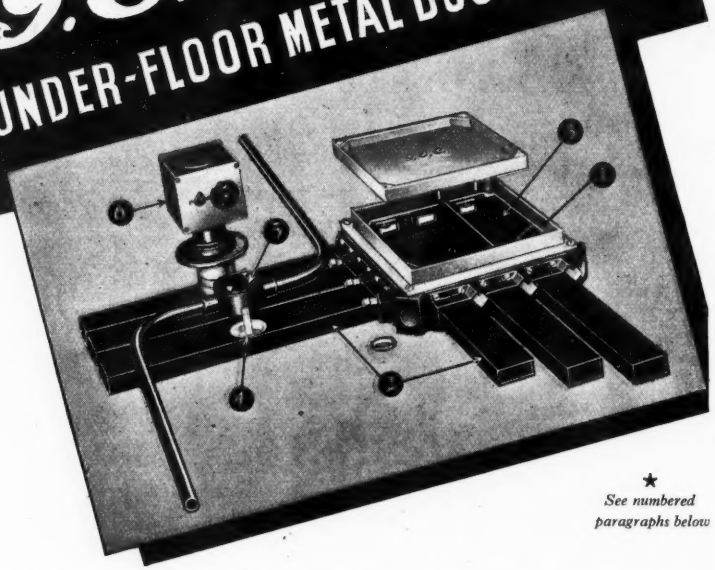

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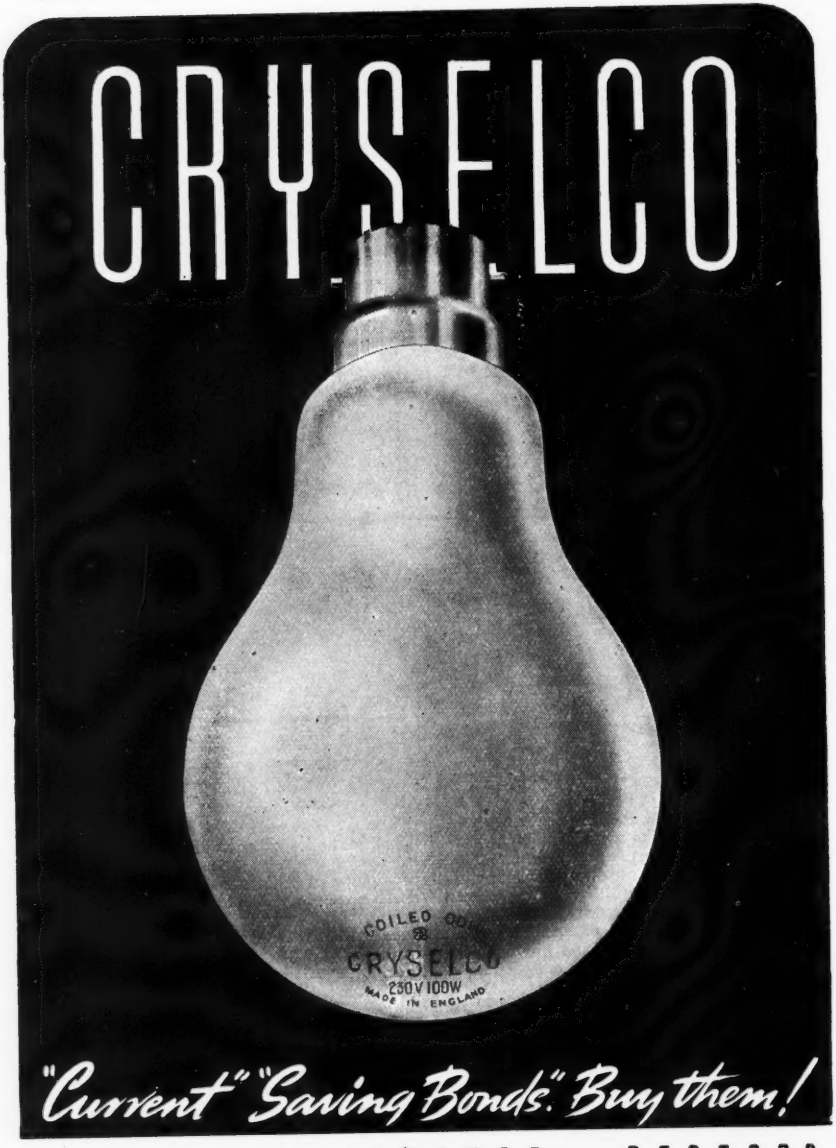

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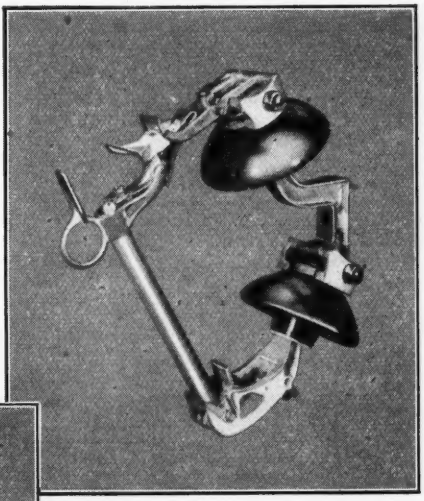

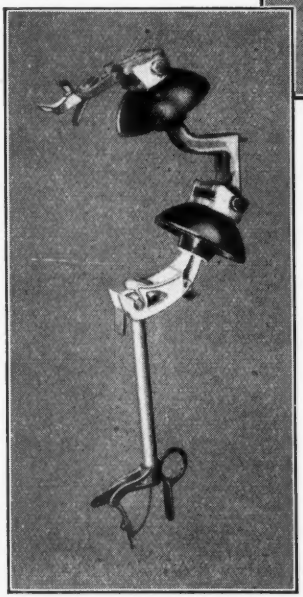

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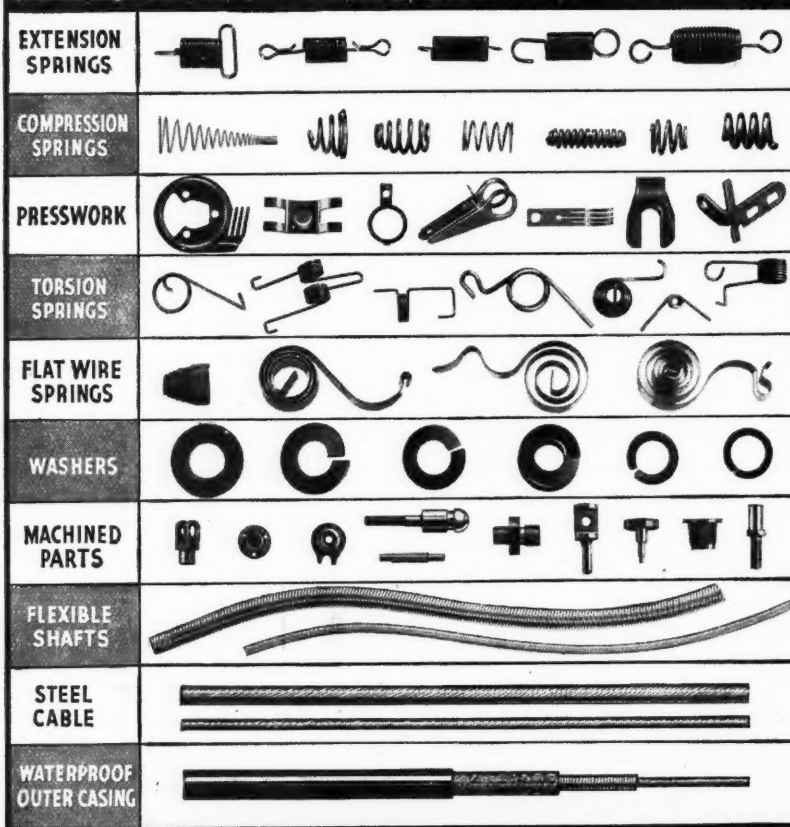

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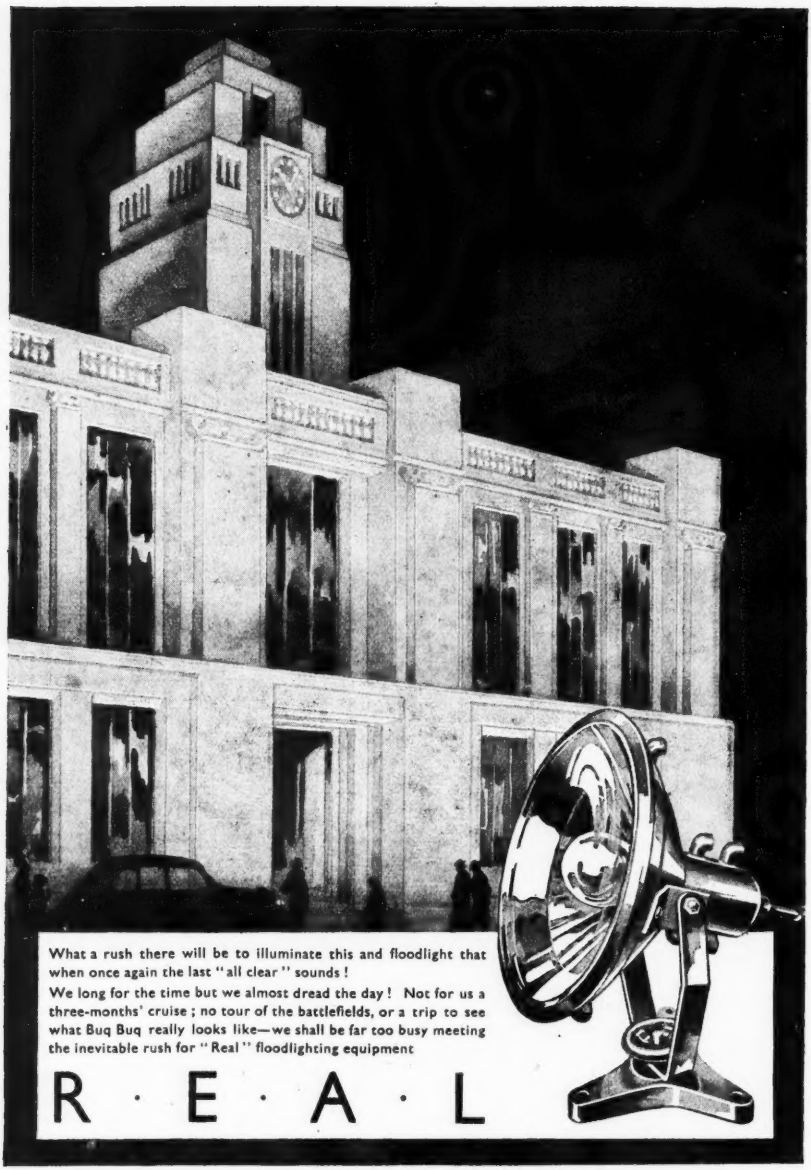
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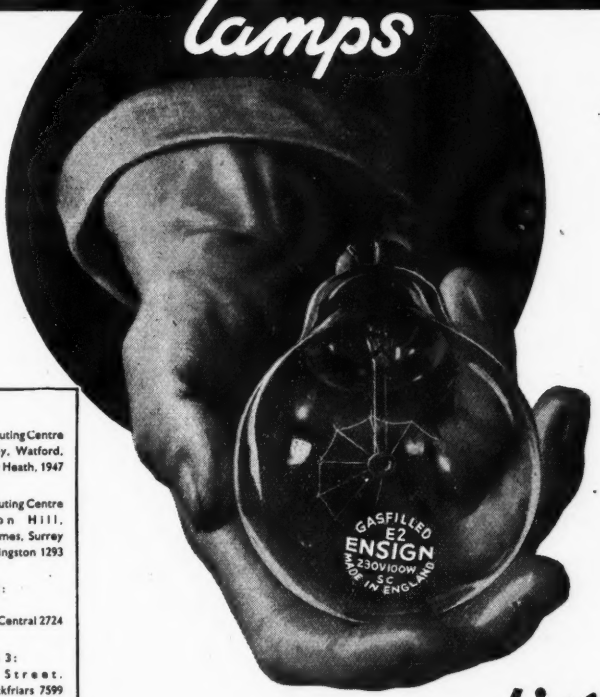

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ELECTRICAL REVIEW

Volume CXXXI No. 3377

Friday, August 14, 1942

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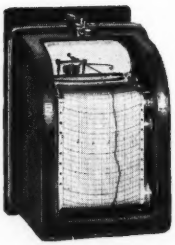

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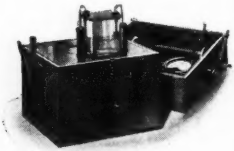

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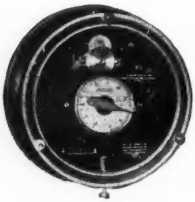

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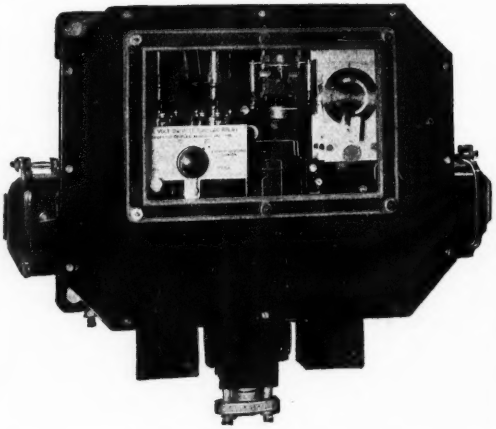

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THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXI. No. 3377. AUGUST 14, 1942 6d. WEEKLY

Future Export Trade

A New Conception Needed

IN the past we have devoted a great deal of attention to export trade, a subject which is now, in the commercial sense at least, in abeyance. It is true that we are still shipping electrical machinery and equipment overseas, but it is practically all designed for military uses and represents not a surplus, but a part of our production which we can hardly spare.

In the meantime, world markets for electrical equipment are stagnating. The countries of the world realise that to a great extent progress means electrification ; they want electrical plant, but call in vain when the chief suppliers are otherwise engaged. In such circumstances they must themselves turn to electrical manufacture or await the time when the regular producers will again be able to take and execute their orders.

Diminished Scope

So far as " utilisation " equipment is concerned, many will endeavour to pursue the first course and the result will be that for the smaller classes of goods they will become largely self-sufficient and to this extent the scope for exporters will be diminished. If, on the other hand, they defer their electrification plans until after the war there will be a scramble for their custom by the leading industrial nations —unless there is a radical change in the system which existed in 1939.

Much is being said about the alterations which will result from the war, but a great many people hope that, after all, things will not be so very different : improved, yes ! but revolutionised, no ! A large proportion of our readers are old enough to remember what was said during the last war. In a purified world all those things which had led to war were to be swept away and nation would speak peace unto nation. Regrettably, not only were those causes of war allowed to remain, many of them were intensified and the harvest of death is being reaped again.

Reciprocal Interchange

Above all, international trade, which should have meant the interchange of commodities between those best able to produce them in a complementary fashion, became a fight for markets combined with attempts to become self-sufficient. This meant a lowering of the standard of life in a world capable of raising it to a level never before attainable.

Goods were almost given away by some of the competitors, with the result that the producers were unable to pay adequate wages while, at the same time, the exclusion of foreign commodities impoverished the producers in other countries. The system was evidently an evil one and yet, the causes being obscure to all but an enlightened few, it was encouraged to persist from ulterior motives, each so-called remedy merely aggravating the disease.

What we have to decide before the war is won is whether international trade is a good thing or whether nations should contrive to meet their own needs, as they may be able to if the needs are kept within

narrow limits. One thing is certain: export which merely represents the moving of goods from one place to another where they could be equally well produced just to build up a form of trade is economically unsound—a waste of time and transport. Those goods which nations can make sufficiently well themselves for their own use should be so made. While crude barter has been outmoded, its basic principle is still a reasonable one: the exchange of goods in a complementary manner.

Quality and Consistency

JUSTIFIABLE complaints have been heard from electricity supply undertakings all over the country about the quality of coal they have had thrust upon them during the past year or two. In the haste to distribute what coal there is it has been impossible to give the same attention to cleaning and grading at the collieries as was the case before the war. The latest pronouncement of the Ministry of Fuel gives little hope of improvement; consumers are asked to "accept" low-grade coal for at least part of their requirements. But while bad coal is troublesome, the undertakings' main worry is inconsistency. A certain efficiency of operation is possible if there is not too much variation in quality, but the receipt of widely-differing consignments, involving constant adjustments of combustion arrangements, is not conducive to the best results. The Ministry should look into this point and endeavour to maintain supplies of a particular class for each station.

Another Post-War Aim

THIS week's reversion from double to single summer time is a useful reminder that it is not too early to begin assuring ourselves that all due care will be taken to avoid thoughtless infringement of the lighting regulations to which is now added the obligation to utilise electric light everywhere with the utmost economy. The consequent effect upon standards of adequacy, raised so gradually, is not being overlooked by the Illuminating Engineering Societies in Britain and the United States. Will the populace, having become accustomed to "synthetic starlight," or no light at all, lose its taste for brightness entirely? *Light and Lighting* does not think so. If light were a mere luxury they might well be expected to esteem it less in future. But there will surely be a desire for restoration, at least, while there may be a danger of excess. The American *Illuminating Engineering* observes that the hardest obstacle, that of furnishing enough light, has been overcome. Illuminating engineers' endeavours after the war must be to provide better quality of illumination. Just as greater intensity has been the need of the past, so will comfortable seeing become the demand of the future.

Restriction of Manufacture

FEW people will quarrel with the Government's decision to impose severe control upon the production of a number of electrical appliances—production which in any event has already been drastically limited by lack of materials. The Order published last week follows the lines set out in the *Electrical Review* of July 10th (p. 46) and stipulates that after July 31st the manufacture of several kinds of domestic appliances will be forbidden except under licence from the Board of Trade. Appliances in course of manufacture at this date may be completed and sold. It is to be hoped that in granting licences the Board of Trade will exercise its discretion in favour of established manufacturers of the appliances.

Employment of Women

THE manufacturing side of the electrical industry has always employed a fair proportion of women workers but other branches have little experience of female labour. In the contracting industry arrangements have been made for this form of "dilution" although so far not a great deal has been done. On the operating side of the supply industry probably still fewer women have been taken on, but the need for them is now becoming urgent. There are many jobs in and about power stations for which women are suitable or can easily be trained, but many undertakings seem reluctant to engage them. Proper accommodation is considered to be a stumbling block, but surely that can easily be overcome.

Nicely Put

IN a recent report of one of the E.C.A. branches it was stated that a mistake made by a certain Ministry was due "to the faulty assembling of relevant facts." In noting the matter, the *Electrical Contractor* considers that this sounds much better than "muddle."

Machine-Tool Driving

Applications to Aero-Engine Production

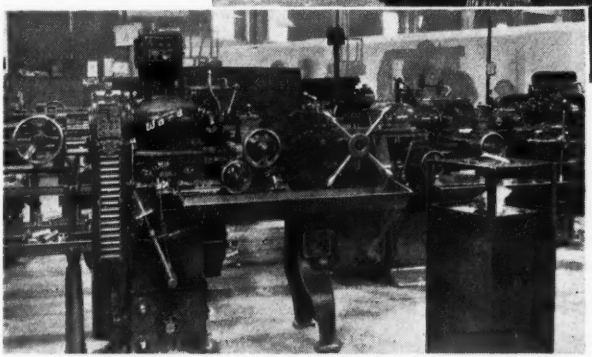
Aspects of the aircraft industry already dealt with include aero-engine testing (May 29th issue) and aircraft maintenance (June 12th). In the present article, based on a recent visit to a large aero-engine factory, the machine-tool driving arrangements are described.

FOR a few years before this war machine-tool manufacturers set a great pace to the electric motor and control gear designers, who had to meet, comparatively suddenly, machine reversing conditions, etc., many times as severe as anything that had been practised hitherto. A result of this was the introduction of various forms of insulation which, if accepted as general practice, must change completely our outlook on motor ratings. These developments, important as they are, are limited to a very small field in the light of what has happened during the past two years of intensive war production, but because of their revolutionary character they have tended to keep the limelight off the more normal developments relating to the bulk of machine-tool work.

The ordinary machine tool holds a key position in almost every kind of munition factory—aero-engine, gun, tank, shell, lorry and so on—so that to get a true perspective of the present trend in machine-tool driving it is necessary for us to take our mind off the " specials " for a moment.

One of the things which adds interest to the work of the technical journalist is that in most factories he can follow production from the raw material to the finished article. To attempt this method in the case of a sizable machine-tool shop with its treatment of numerous mechanical components, however, would be extremely tedious, so that in portraying general driving arrangements as we saw them recently in a large aero-engine works we shall deal with certain selected machines which, we believe, represent, from the viewpoint of this article, a cross-section of the installation.

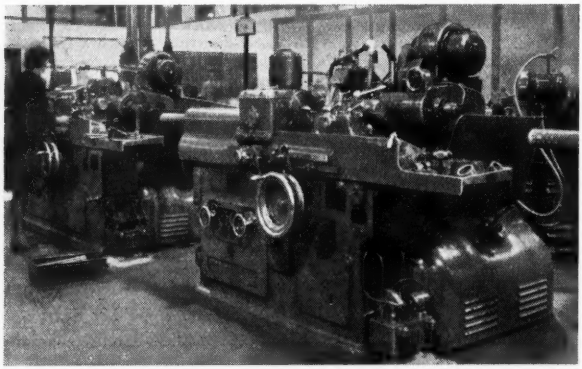
The machines in question are in the main small and medium equipments. For what we may describe as general-purpose work, such as the turning, cutting and threading of bolts and screws, etc., there is a section of small capstan lathes of which the following is a typical example, with reference to the driving arrangements. The 3-HP, 1,420-RPM, 400-V, squirrel-cage, three-phase motor is bracketed to and near the base of a machine used for light-bar turning. Transmission is first by V-belt to a gear train from the final shaft of which there is flat-belt



Of major interest in semi-automatic lathes is mechanical operation of the headstock from a constant-speed continuously running motor

For general-purpose work there are small 12-speed capstan lathes

transmission by change-over pulleys to the headstock. All speed changes are mechanical by means of a lever-controlled gear-change arrangement in the gearbox, the motor itself being a single-speed unit, and by "ringing the changes" a total of 12 speeds can be obtained, from 75 RPM to 4,130 RPM. Simple push-button stop and start arrangements are provided, the simple contactor starter being mounted well above the machine away from oil splash.

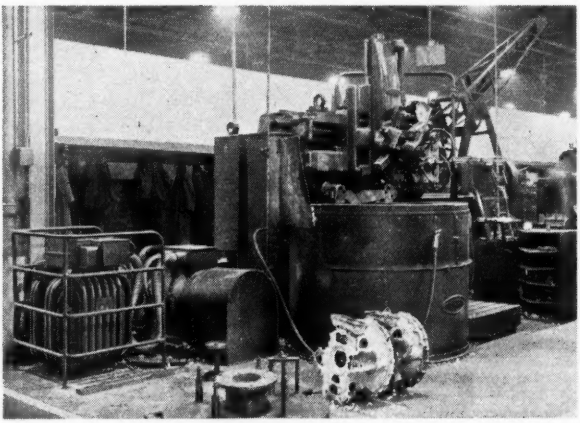


Very fine speed control is required for the squirrel-cage grinding machines which, in consequence, are DC driven with Ward Leonard control

For the turning and threading of small parts semi-automatic lathes are mainly employed. A major point of interest about these lathes is that the driving unit is a constant-speed equipment, running continuously, while the headstock moves backwards and forwards on the completion of each operation, so as to discharge finished work and receive new work, all under mechanical control. The 5-HP, 1,500-RPM, single-speed, 400-V motor is situated right at the top of a machine used for medium chucking work up to 4 in. diameter. Transmission is by flat belt on two-step cone pulleys to a gear box with a 3-to-1 reduction ratio, and by V-belt to the headstock with a further reduction of about 5-to-1, thus giving the final headstock speed of about 100 RPM. Starting is by a simple contactor unit with push-button control.

An outstanding example of change-gear work is that relating to some multiple drilling machines used for jig drilling with more than one size of drill. Each of these has four 1.25-HP change-speed motors with shaft speeds of 1,500, 1,000, 750 and 500 RPM. The electrical change-speed control is in the form of a four-way lever after the style of the gear-changing arrangement on an automobile, the switch box, with its projecting operating lever being flange-bolted to the bottom of the motor from which the lever projects at an angle of 45 deg. downwards. Three speeds operate direct on the drill spindle, the fourth speed, for tapping purposes, being geared to give a spindle speed of 96 RPM. The main control is by a push-button operated contactor starter.

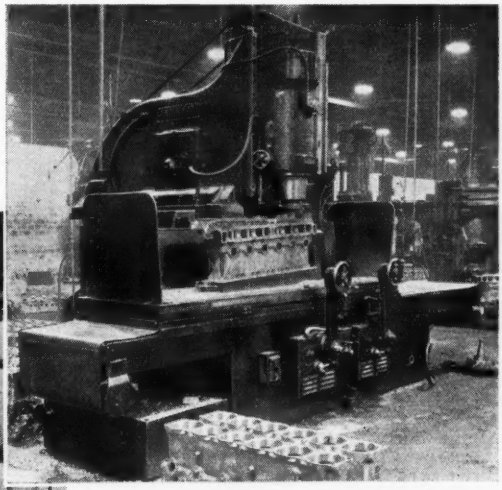
We saw a group of grinding machines employed on reducing turned crank shafts and on the production of threads in place of screw cutting by means of serrations on the periphery of the grinding wheel itself. Very fine and wide speed variation is required for these machines, with the result that each is DC

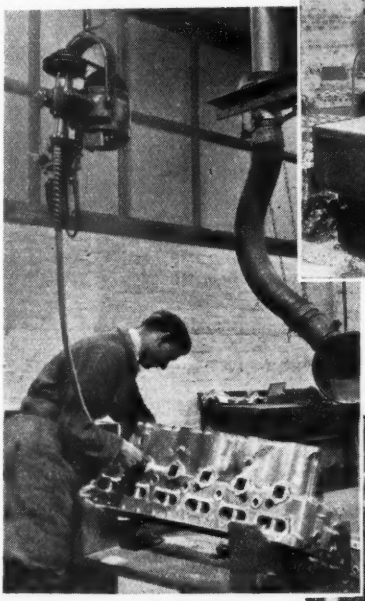


Another example of very wide speed variation is that of a vertical boring machine with an AC commutator motor drive

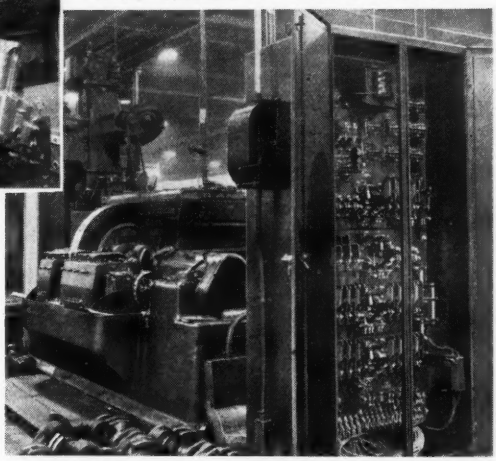
motor driven with its own self-contained system of Ward Leonard control. A motor-generator set with a 5-HP, 1,440-RPM driving motor and two 2-HP generators is housed in the base of the machine. The DC generators supply the wheel-head and work-head driving motors at 110 V, the field regulation being arranged by a rheostat, the operating handle of which projects from the front of the machine base. The DC motors have a speed range of from 2,500 RPM to 250 RPM, and transmission in each case is *via* a 3-to-1 ratio reduction gear. A third motor serves the hydraulic system by which the work-table traverse is operated.

Another example of very wide speed variation is that of a vertical machine used for boring and profile turning of aluminium castings, but in this case an AC variable-speed commutator motor is employed. This 15/10-HP floor-mounted motor has a speed range from 1,500 RPM to 500 RPM, the variation being effected by an induction voltage regulator which serves the field system of the motor. This main motor drives the machine table only, for which there is first V-belt transmission, and secondly gearing transmission with an overall reduction of about 5 to 1. The machine head is driven by another constant-speed 3-HP, 750-RPM motor with gear giving a head speed of 200 RPM.





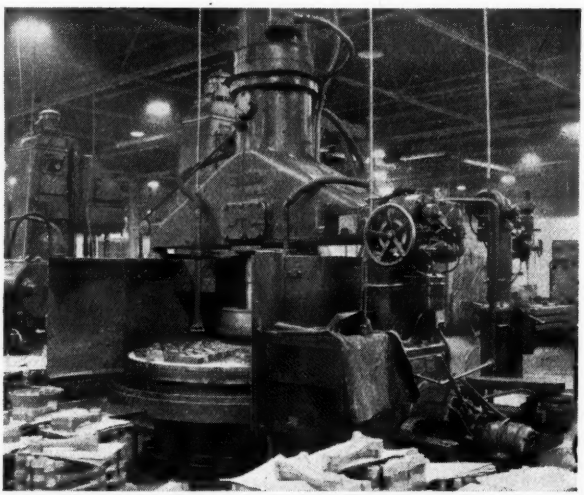
Above : A special equipment employed for the internal and external machining of cylinders is the "Hydro-tel"
Left : Polishing the internal surfaces of engine cases is effected by hand tools driven from suspended overhead driving units
Below : A crankshaft turning lathe represents a noteworthy application of a modern control panel



A control unit for all the operations by both motors is suspended at the end of a control cable at the operator platform. It has stop, start, accelerate, and retard push-buttons for the variable-speed table motor, and simple stop and start push-buttons for operating the machine head motor.

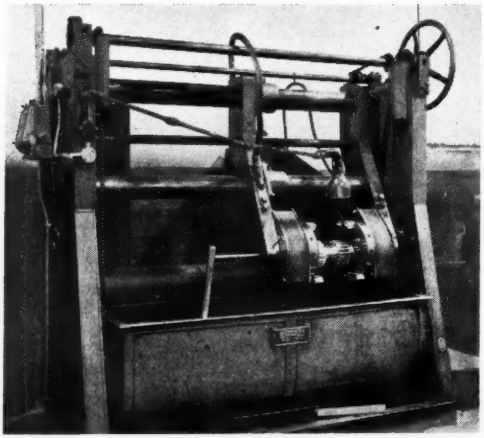
Actually the retarding and accelerating of the table are effected by a small pilot motor which selects the tappings on the induction regulator in order to provide the required speed.

A rather special equipment employed for the internal and external machining cylinders is the "Hydro-tel." This has a 5-HP, 1,440-RPM, squirrel-cage motor serving the boring head, transmission being by V-belt to give a final spindle speed of 80 RPM. Serving all the feeds there is a hydraulic system with several small motors. All the contactors and push buttons are housed on one panel at the front of the machine.



We were interested in a grinding machine mainly on account of its large magnetic holding table

For the removal of rough edges and other projections resulting from machining, etc., on the internal surfaces of engine cases polishing operations are carried out after the style of foundry fettling. This work is undertaken on the individual principle from semi-portable polishers. The 0.5-HP, 2,800-RPM, AC driving motor in each case is carried in a cradle at the bottom of a pipe about 4 ft. long which has a universal joint at the top where it is suspended from a girder structure. The movements permitted by the universal joint and the cradle swivelling, plus that afforded by the flexible shafting from the motor to the hand tool, give a freedom equal to that of the portable tool within a certain radius from the motor. The motor drives *via* a three-step pulley and belt system to give spindle speeds of 6,000, 2,850 and 1,600 RPM, transmission being by a flexible shaft terminating in a rotary cutter.



Specimens are magnetised in such a way as to provide magnetic fields crossing at right angles the cracks to be detected

A dual interest pertaining to a lathe used for heavy forming of crank shafts is that it represents a first-class application of a modern control panel and also a good example of adaptation to different factory conditions from those for which it was designed. The floor-mounted 40-

HP motor has multi-V-belt transmission to the machine shaft, with a speed reduction ratio of about 3-to-1, while four speeds of 1,450, 960, 720 and 470 RPM are arranged from the constant HP motor itself. The speeds are selected by a rotating cam switch, which also controls the hydraulic feeds. The hydraulic system has a separate constant-speed 5-HP motor. At the end of the automatic cycle a timing relay is actuated, breaking the circuit to the forward contactor and closing the circuit to the reverse contactor. When the motor starts to reverse the circuit is broken by means of a plugging relay which brings the motor to rest by application of a solenoid brake, and the machine is then ready for unloading and reloading. All the operations are effected by contactors well spaced out in a nearby sheet-steel control cubicle, each contactor being complete with its individual magnetic blow-out.

We were interested in a machine used for rough grinding forging faces in nickel steel mainly on account of its large 6-ft. diameter working table on which we saw a couple of dozen or so crank arms held by a magnetic chuck during grinding. The table and the smaller grinding wheel are arranged eccentrically and are separately driven, the wheel from a flange-mounted vertical 50-HP, 600-RPM motor surmounting the machine, with direct transmission to the wheel shaft, while the 3-HP, 1,000-RPM table motor is floor mounted and transmits *via* V-belts and gears to give a table speed of 12-RPM. There is also a 0·5-HP, 1,500-RPM motor for the feed, transmitting through ratchet mechanism. For supplying the magnetic chucks at 330 V, DC, the machine is provided with its own floor-mounted motor-generator set. When the machine is running the table is enclosed by a guard to prevent the pieces from flying off the machine should the supply to the magnetic chuck fail. All the electrical controls are manually operated.

The object of tests carried out on crack detecting apparatus is to locate surface cracks by magnetising the specimens in such a way as to provide magnetic fields crossing the cracks at right angles. A specimen is clamped between brass V blocks, or, if it is a hollow specimen, it is threaded on to a brass conductor. Fluid in a bath contains minute magnetic particles in suspension, and before commencing the test the fluid is stirred by means of the special rod provided. The first operation consists of raising the tank to an intermediate position, which automatically switches on a fixed direct current of about 5A. The tank is then raised to its extreme limit, when the direct current is switched off and an alternating current is applied. The alternating current is variable and is of the order of 500 A per inch diameter of the specimen. The alternating current is left on for about 2 seconds, when the tank is lowered. This is followed by a further application of direct current, and then all current is switched off.

After the specimen has been allowed to drain, a visual examination is made to locate cracks, which are indicated by the adherence of the magnetic particles. Certain hard-steel objects such as crankshafts may require to be demagnetised after testing, and this is accomplished by passing the specimen through a demagnetising coil.

Mysore Water-Power

Gersoppa Falls Scheme

IN the *Electrical Review* of September 22nd, 1939, details were given of the Gersoppa (or Jog) hydro-electric project, designed to provide an abundant supply of electricity for the industrial development of the Indian native state of Mysore, on the Deccan plateau. Further facts about the scheme have been published in *The Times* Trade and Engineering Supplement.

The Gersoppa Falls, a cataract on the River Sharavati, are situated in a thickly wooded spot 64 miles from Shimoga (about 235 miles from Bangalore). Here the river is 230 ft. wide and flows over a rocky bed for 250 yd. before it falls over an 830 ft. cliff in four separate leaps and then passes through a narrow gorge to the Arabian Sea. The river has a catchment area of 700 sq. miles and receives a heavy annual rainfall, mostly from the south-west monsoon, at which season the river-flow may amount to 160,000 cusecs compared with a dry-season flow of 4 cusecs. Calculations have disclosed that 22,000 million cu.-ft. of water can be economically stored, and a reservoir is being constructed at Hirebhassar, 13 miles up stream, having sufficient storage capacity to supply 120,000 kW of generating plant, which is the designed capacity of the station now being built a mile from the falls. A barrage 10 miles downstream from the reservoir dam will direct the river water into a three-mile-long canal with a bed-slope of 3.3 ft. per mile. A balancing reservoir is also being constructed to provide diurnal storage for a load of 96,000 kW at 0.75 load factor.

Present plans provide for the installation of four generating sets each of 12,000 kW ordered from Boving & Co.; the alternators will be supplied by the British Thomson-Houston Co.

The Gersoppa plant is being linked with the Cauvery and Shimsha Valley schemes so that the three beautiful falls of Mysore State—the Cauvery at Sivasamudram, Shimsha at Shimshapura and Jog at Gersoppa will provide a supply of electricity to thousands of consumers.

To tie up with the State system, a high-voltage overhead line will transmit the power from Gersoppa to Bhadravathi, and for this purpose outdoor switchgear and step-up transformers have been ordered from the B.T.H. Co.

War Damaged Premises

Procedure for Settling Rent Disputes

By F. E. Sugden, A.C.I.S., Barrister-at-Law

IN these troubled times the electrical contractor is sometimes faced with two questions. First, if his premises have been damaged by enemy action, what procedure should he adopt to secure a reduction of rent as a consequence? Secondly, bearing in mind the same theme, suppose the electrical contractor is called on behalf of a tenant to substantiate a claim before the Courts for a reduction of rent, what evidence should he give in support of the tenant's claim? I consider that if I answer the first question fully the second takes care of itself.

The tenant should first of all approach his landlord and ask for a reduction of rent because of war damage. This procedure is necessary in order that, if required, he can prove to the Court subsequently that he first approached his landlord before taking proceedings, and thus will be able to claim costs because the landlord was unreasonable in his decision. The landlord may say that his overhead charges have gone up and he cannot afford to reduce the rent, however good the tenant's case may be, but that he will make a nominal reduction.

With half the property demolished the tenant very properly says that the reduction is not enough, and therefore he invokes the relief granted by the Landlord and Tenant (War Damage) (Amendment) Act, 1941, which gives him the right to apply to the County Court Judge of the district in which his premises are situated.

County Court Application

Section 1, subsection 7, lays it down that " the landlord or tenant of any land let on a short tenancy (a three-monthly tenancy or less) may at any time apply to the Court to determine whether the land has been or was at any time unfit by reason of war damage or any other question arising in this section in relation to the tenancy." The term " land " here includes business premises, dwelling houses, etc.

If the tenant applies to the Court to determine what rent is payable as a consequence of enemy action, he makes what is called an " originating application " at the County Court. The application contains the name and address of the tenant and the grounds upon which he contends he is entitled to a reduction of rent. For instance, the damage to the rooms should be described.

The next point to consider is the evidence to prove the case. Frequently expert witnesses are expensive and here the tenant may invoke the help of the local borough council and if necessary subpœna the appropriate officials, relying on practical professional experience in this matter. The tenant will probably have applied to the council for first-aid repairs immediately the premises were damaged. The council will then have sent an inspector to look at the premises, and in consequence first-aid repairs, such as repairs to the roof and some of the windows, will have been carried out.

Reduction of Rates

No doubt the tenant will also have applied for a reduction of rates ; if the premises have been very badly damaged the council may allow a reduction of 50 per cent. on the rates, but it will not allow that reduction unless it has inspected the premises and is satisfied that the premises are not fully habitable. The department which deals with first-aid repairs is usually the Housing Department. Then the Sanitary Department of the council must be satisfied that the premises are fit for human habitation and if sanitary arrangements are defective or the roof leaks, or the premises are not, as we say in law, " wind and water tight " it will serve a notice on the owner to remedy the defects.

Such a notice will have a double effect : it will help the tenant to prove his war damage for reduction of rent and also, if the premises are below a certain rateable value or rent, it will give him protection under the Rent Restriction Act for objection to increased rental for repairs, etc.

With these reports received from the appropriate officials of the borough council, I advise the tenant to give notice to the landlord to admit the contents of these documents, and no doubt the landlord will inspect the original letters, and may even desire copies of them. This will help the County Court Judge to decide the proper rental.

I may state in passing that even under the Rent Restriction Act, 1923, the County Court usually has power, on the application of the landlord or tenant, to determine summarily any questions as to the amount of rent, the standard rent, or the net rent of any dwelling house. Section 1, subsection 10 of the Landlord and Tenant (War Damage) (Amendment) Act, 1941, lays it down that the term " dwelling house " includes a shop or office or trade or business house for professional purposes.

Transformer Design

Recent Developments

By D. W. McJannet, Assoc.I.E.E.

VERY little major development has taken place in system conditions in Great Britain during the last few years, although the power behind the grid has continued to increase and there has been a closer linking up of undertakings for emergency supplies in case of damage resulting from enemy action. Such increase in power and interconnection of systems has increased the current possible under fault conditions and has thus thrown extra strain upon existing plant, especially switchgear. Current limiting reactors have been introduced in many cases to enable existing switchgear to withstand the more onerous conditions. Transformers have been designed to provide sufficient inherent reactance to limit such current to reasonable proportions and the mechanical construction is such as to withstand the forces thus imposed. The E.R.A. is carrying out research relating to the mechanical forces applied to windings when short-circuits occur on the system to which the transformer is connected.

The attention of transformer engineers has been devoted in recent years to improvements on the following lines: (1) The development of surge- and lightning-proof transformers. (2) Reduction of losses more particularly with regard to distribution units. (3) Reduction of fire risk. (4) Construction of large self-contained units for emergency use.

Surge-proof Transformers

The production of surge-proof transformers has been developed along two main lines. One body of opinion favours the provision of copper shields which exert a measure of control over the inter-turn stresses, while a second school inclines towards the detailed design of the inter-turn insulation itself.

The unequal voltage distribution through the transformer winding is the fundamental cause of breakdown under surge conditions. If the initial and final voltage distributions are the same no oscillations will take place and consequently the stresses throughout the winding will be uniformly distributed. This can be achieved by mounting outside and around the high-voltage winding insulated shields connected to the line end of the winding (fig. 1). Proportioning the shields, so that for every coil in the winding a charging current equal to the earth capacitance current for that particular coil is supplied by the shield, will supply all the shunt capacitance of the winding, thus removing the cause of non-uniform voltage distribution.

For voltages below 132 kV such extensive shielding is unnecessary, but it is claimed that the use of modified electrostatic shields will reduce the stresses to about one-third of the value existing in a non-shielded winding.

The second method which has been developed extensively is known as the stress-control winding. In this case the stresses between turns and coils are predetermined by the insulation distribution in such a manner that this insulation provides ample margin of electrical strength in all parts of the winding. The insulation used actually provides the electrical strength to control the

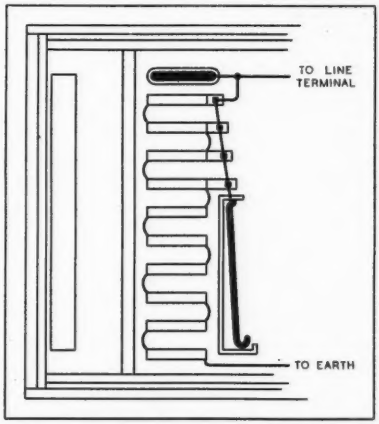


Fig. 1.—Method of distributing surge stresses evenly throughout the winding

corresponding electrical stresses. This design, it is claimed, gives an increase in lightning strength of two to five times normal at a small additional cost while the thermal and mechanical characteristics remain unchanged.

The extensive report recently published by the E.R.A. has been most helpful in the study of this problem, and with the aid of the surge generators now installed by some of the larger manufacturers full-scale tests on various types of winding can be carried out. It is still impossible to say with certainty that the imposing of these voltage tests does not damage the insulation to an extent which, while not showing up under ordinary power-frequency tests, may seriously affect the life of the transformer. It is, therefore, the usual practice, when a surge test is called for,

to provide a separate limb of coils wound to the same specification as the transformer for testing purposes. A number of manufacturers are examining the problem with the aid of the recurrent-surge oscillograph, and much useful data is obtainable without any harmful effect on the insulation.

Research along the lines indicated is still going on and it is likely that, in the not too distant future, a winding may be produced which is proof against lightning and which can be fitted to any transformer as a standard measure.

Much progress had been made prior to the outbreak of hostilities in the production of transformers having very low iron losses, mainly for rural electrification schemes. The results obtained were due partly to improved design, but mainly to the production of grades of core steel having a low loss per lb. While such transformers are more expensive than standard units, some undertakings have found it profitable to install them because of the considerable reduction in running costs.

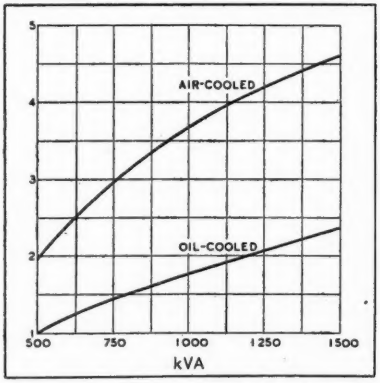


Fig. 2.—Relative costs of oil- and air-cooled units

Unfortunately the outbreak of war caused a cessation of the production of low-loss steels, but it is reasonable to suppose that when peace returns these will again be available, and that as a result of research the standard achieved may be even better than before.

The fire risk problem has of late been brought somewhat nearer solution by the development of insulating materials capable of withstanding high temperatures and of cooling media of a less inflammable nature than oil. In the first case this has led to the construction of transformers of the naturally air-cooled type having a higher temperature rise than that laid down in B.S.S.171/1936.

For many years manufacturers have been prepared to supply naturally air-cooled units up to approximately 1,500 kVA output and 11 kV, but these have been much more costly than oil-cooled units (see fig. 2). They have been built to comply with B.S.S.171/1936 (*i.e.*, the temperature rise by increase in resistance does not exceed 55 deg. C.) and they have embodied the usual grades of insulating material.

Designers have thus been forced to use low values of density both for iron and copper to avoid exceeding the limits of temperature rise and the formation of hot spots, hence the amount of material required is very much in excess of that in an oil-cooled unit and more than balances the omission of oil and the simple construction of the protecting case.

With the advent of new forms of insulation which can be applied to the conductor and used for all other insulating purposes, the temperature can be allowed to increase and consequently, the weight of active material is reduced. It should, therefore, be possible to rate such a transformer up to a temperature rise of, say, 70 deg. C. by increase in resistance, giving an ample margin of safety, in which case the cost should not be greatly in excess of an oil-cooled unit. Investigations are being carried out and the final word has not yet been said.

Non-Inflammable Fluids

Research has been taking place during the last eight years into the employment of non-inflammable insulating fluids. Those at present available are largely chlorinated diphenyls, the degree of inflammability depending upon the value of chlorination. A 48 per cent. chlorinated compound has a flashpoint of 196 deg., but is self-extinguishing, while a compound 54 per cent. chlorinated has no flash point and will, in fact, act as a fire-extinguishing fluid.

There are, however, certain disadvantages in the use of these compounds, the most serious being the steepness of the viscosity-temperature curve. The 54 per cent. chlorinated compound is practically as fluid as transformer oil at 60 deg. C., but at 5 deg. is almost a solid. The 48 per cent. chlorinated compound has a viscosity at 35 deg. about the same as Grade A oil at 20 deg.; at 60 deg.* it is thinner, but at 0 deg. it is a thick semi-solid. It is heavier than water and hence special precautions must be taken against flash-overs across the surface should water gain access. On the other hand it is not prone to acidity and the dielectric constant is approximately 5, thus bringing the stresses on insulating fluid and solid insulation to more nearly equivalent values.

None of the several installations employing this or similar insulating fluids have been in service long enough to give definite information regarding the life of the transformer and the effect on insulation over a period of time at fluctuating temperatures.

*See "Fluid Filling Media for Electrical Apparatus," by F. Meyer, B.Sc., *I.E.E. Journal*, Vol. 86, page 313.

The design of large self-contained transformers for transport anywhere in Great Britain is really a development to meet emergency demands. A number of units have been provided of various sizes, the largest being 30,000 kVA with a ratio of 132/66 kV. The problems encountered were mainly of a mechanical nature in providing space required for the various fitments inside the loading-gauge limits. The transformer, with coolers, off-circuit tapping switch, bushings, conservator and oil, has to be handled as a complete unit and the high- and low-voltage bushings are fitted on the short sides of the tank.

Special Serck coolers are mounted below the 66-kV bushings together with oil pump, fan and their associated motors. To comply with the loading gauge the conservator is of an unusual flattened construction and is fitted with baffles to reduce oil surging during transit. The off-circuit tapping switch is mounted on a side pocket with an easily accessible handwheel. For supplying the cooling motors and for substation services an auxiliary winding is provided, which is brought to a weatherproof distribution fuse-box mounted on the tank side. A view of the complete unit mounted on a lorry ready for transit is shown in the accompanying illustration.

In order to economise in material there has been a tendency to revert to higher densities, especially in the case of the core. Before the war there was a downward trend in the values of flux density employed and this became more or less stabilised at 11,000 lines per sq. cm. As a result of the war, designers are going back to values of the order of 13,500 lines, which economises copper as well as steel.

A 30,000-kVA, 132/66-kV mobile transformer mounted on a lorry trailer

In America, a new grade of core steel known as "Hipersil" has been produced the characteristics of which enable the core to carry 38 per cent. more flux than silicon steel of the same dimensions. A 40,000-kVA, three-phase, 138-kV unit of this kind has recently been manufactured for forced-oil cooling with resultant important reductions in weight and size. The complete unit ready for service with its full complement of oil was dispatched on a standard flat railway wagon. Compared with a standard self-cooled air-blast transformer of the same output the copper weight is 10 per cent. less and the iron weight 25 per cent. less, while the losses are only 5 per cent. greater. It is unlikely that this steel will be available in Great Britain while the war continues, but it would appear to have possible applications here.

There is a suggestion from America that, in order to meet present commitments with a minimum expenditure on new plant, transformers should be rated up to the limit of heating capacity, even though this may reduce their useful life. It is thought possible that the reduced life might carry us through the war and the period immediately following, say five years. The writer would not like to make any guarantee on this point. If the rating of existing transformers were increased to any large extent, this would undoubtedly lead to hot spots, deterioration of insulation and oil and the possible failure of the plant when most needed. Where transformers are fitted with winding-temperature indicators output can be obtained during peak periods by operating the plant strictly on the temperature of the winding. This procedure necessitates the attendance of an engineer to control the loading, not always a possibility with reduced technical staffs.

The best procedure seems to be to design all new plant on strictly economic lines with a view to conserving material as much as possible, but no modifications of design should be permitted which will introduce unreliable service.

Where naturally cooled transformers are provided with radiator banks of the "A" type, increased load can often be obtained during peak periods by installing a suitable

fan and cowling to blow air into the radiators. This should only be done, however, after consultation with the makers, as hot spots may occur in the winding if the rating is pushed up too far.

When such units are fitted with on-load tap-change gear, although the transformer and contactor gear may permit an increase in loading, the rating of choke coils, auto-transformer or resistance units may not be suitable for the higher current and consequently the gear could not be operated during the overload period when it is most likely to be required.

The auxiliary chokes, autos, or resistance units could, of course, be replaced by apparatus of higher rating, but this would in most cases involve the removal of the tap-changing gear for the time required to carry out the necessary modification, a procedure which is very seldom convenient under existing conditions.

The Chicago Subway

First Route Nearly Ready

COMPLETION of the first Chicago subway route by the end of this year was forecast by Mr. C. E. De Leuw in a paper presented at the summer convention of the American Institute of Electrical Engineers held in Chicago and reported in *Mass Transportation.*

The present project, started only four years ago, comprises the construction of two subways at an estimated cost, including fixed equipment, of $64 million. These will become an integral part of the city's rapid transit system.

Route 1, the State Street subway, is nearly five miles long and connects at the north and south with the elevated route. Basic subway construction on this route is complete and the elevated connections at the termini are now under construction. Station finish, much of which was redesigned to reduce the use of essential war materials, has been more than half completed. Route 2, the Dearborn Street subway, is the first unit of an underground terminal system for the west side rapid transit routes and is nearly four miles long.

In general, stations on the State Street route are of the mezzanine type constructed by cut-and-cover methods and located as close as possible to the street surface. Platforms are 500 ft. long, except in the congested area where there is a continuous island platform 3,300 ft. long. Escalators operating at 90 lineal feet per minute connect the mezzanine level with the platform level, which in most cases is 40 ft. or more below the street. They are reversible and controlled by push-buttons near the top and bottom of each escalator.

Fluorescent Lighting

Normal illumination in the stations will be by 48-in., 40-W white fluorescent lamps mounted in single-tube fixtures with power-factor correction auxiliaries in the base, the lower half of each lamp, and reflector, being enclosed in a frosted-glass globe. The installations are planned to give lighting intensities of from 6 to more than 8 ft. candles on the mezzanine floors and station platforms.

As the trains will be routed through the subway from the elevated railway the power system is, of course, the same, *i.e.*, 600-V, DC with a return through the running-rails, negative feeders and to a limited extent through the steel elevated structures. Power will be obtained from existing substations of the Commonwealth Edison Co.

A new and heavier contact rail section has been adopted weighing 144 lb. per yd. and having a conductivity equivalent to 2,250,000 circular mils of copper. To obtain longer life the rails have a somewhat greater hardness than the high-conductivity rails of other subways. The paralleling feeders necessary to provide the additional conductivity required are insulated with water-resisting compound and tapped to the contact rails at intervals of about 1,000 ft. through disconnecting tap switches. The negative reinforcing feeders in parallel with the running rails are similarly insulated and are tapped at intervals of 400 ft. Both types of feeder are carried in a duct bench containing twelve asbestos-cement conduits along one side of each track.

Since the block signal system of the subway tracks is to be of the single-rail track-circuit type one rail of each track will be used exclusively for signals, leaving one rail for traction current return. Each running rail has a conductivity of approximately 1,000,000 circular mils of copper, supplemented by the negative reinforcing feeders. Running rail joints are generally all-welded except in the case of special trackwork.

Central Control

Adequate sectionalisation of the entire system is provided, the tie, substation and all sectionalising and disconnection circuit-breakers being of the latched-in air-break type remotely controlled by the supervisory system. Centralised supervisory all-relay control includes an illuminated diagram board and relay cabinets of the swinging panel type.

Train movements will be controlled through a modern signal and electro-pneumatic interlocking system with automatic train stops. Colour-light signals are to be spaced and timed for the operation of forty trains of five articulated units per hour. Signal power supply equipment is located in eight signal rooms, the AC signal mains being fed at 110 V, 60 cycles through liquid-cooled transformers and the DC mains at 16 V through copper-oxide rectifiers.

It appears likely that the State Street subway will be ready before the new rolling stock is available, and it will therefore be operated initially by 455 steel cars of the Chicago Rapid Transit Co. New 45-MPH streamlined articulated trains consisting of three-compartment bodies on four trucks and propelled by eight motors totalling 440 HP are being built, and the ultimate capacity of the subway thus equipped will be 80,000 passengers an hour.

Multiple Earthing

Proposed Amendment of Electricity Supply Regulations

By S. H. Parker

THE report just published in the *I.E.E. Journal* (July, 1942) on "Multiple Earthing" raises some interesting points with regard to both earthing and fusing, and tends to clarify a position regarding the latter which has given rise to much discussion.

The report recommends (1) that modification should not be made in present-day earthing practice in areas where the supply authorities' distribution networks consist of underground cables, but suggests modifications of Regulation 4 of the Electricity Supply Regulations (1937); and (2) that where a supply authority's overhead distribution system is at low or medium voltage and "it can be ensured that the distribution network and the consumer's installations are under the same control" . . . "protective multiple earthing" shall be permitted. This consists of connecting the consumer's earth continuity conductor to the neutral conductor at the consumer's terminals, and also to earth electrodes at each consumer's premises.

With regard to (1) it is generally agreed that earthing to the sheath of an underground cable, or to the public water supply system, is satisfactory from a protective point of view subject to the modification of the Regulation referred to, provided that obvious precautions are taken, but the suggestion in (2) would give a greater degree of protection in rural areas where the problem of satisfactory earthing is sometimes a very real one.

Deteriorating Conditions

Although the Electricity Supply Regulations (1937) define "connected with earth" as "connected with the general mass of earth in such a manner as will ensure at all times an immediate and safe discharge of energy" and the I.E.E. Regulations give details as to how tests should be made in order to determine that a "consumer's earth resistance" is low enough to ensure that protective devices operate, too often the desired conditions are obtained at the time of the original installation only and they rapidly deteriorate to such an extent that fuses will not blow, even under earth fault conditions.

It may be argued that these are cases in which earth-leakage protection should be provided as specified by the I.E.E. Regulations, but often this is not done because conditions are satisfactory to commence with and in any case earth-leakage trips have disadvantages. "Protective multiple earthing" would overcome these difficulties and ensure that protective devices operate, even in rural areas where subsoil resistance is high; it would also save the cost of earth-leakage trips and not increase distribution costs.

The modification of the Electricity Supply Regulations referred to above raises the question of fusing. It is common practice for supply authorities to provide a single-phase service to consumer's premises consisting of a fuse in the phase conductor and a neutral link, whereas the main fuses and distribution board provided by the contractor are of the double-pole type. One of these appears to be wrong, but the latter is essential to comply with I.E.E. Regulations (Reg. 111 and Table 2) for consumer's premises with a single-phase supply derived from a distribution system which is not "permanently and effectively connected to earth." This type of installation and supply probably comprises the majority in this country, and it seems strange, therefore, that the point has not been clarified before. It is so obvious when looking at the supply authorities' single-pole fuse service alongside double-pole consumers' fuses.

Double-Pole Fusing

The I.E.E. Regulations are very definite upon this point, and the note at the end of Regulation 112 gives the definition of a "permanent and effective connection to earth" as "one which is not broken in any circumstances, including testing." In the note at the commencement of Section 9 reference is made to Regulation 4 of the Electricity Supply Regulations (1937) pointing out that most supply undertakings' systems are earthed at the transformer only and it is permissible for the supply authority to include a link in this connection for testing purposes. These kinds of networks cannot be termed permanently connected with earth. Double-pole fusing is therefore necessary in an installation deriving a supply from such systems.

The Electricity Supply Regulations (1937) are not so definite. Reg. 24, dealing with supply to consumer's premises, states that . . . "no such fusible cut-out . . . shall be inserted in any conductor which is permanently connected with earth." A definition, however, is not given of a permanent connection with earth. Reg. 4 (iv) states that "the connection with earth may include a switch or link by means of which the connection with earth may be temporarily interrupted for the purpose of testing or for locating a fault" and in spite of the definition

referred to in para. 3 above, such a connection cannot be construed as a " permanent connection with earth."

The report referred to recommends that in order to clarify the situation Reg. 4 (iv) should be made to read on the following lines: " The connection with earth may include a switch or link by means of which the connection may be temporarily interrupted for the purpose of testing or for locating a fault while the circuit is dead. It may also be employed for the insertion of an ammeter in the connection with earth while the circuit is alive, without interrupting the connection with earth."

The Electricity Commissioners, in their views on this report, have agreed to make an appropriate amendment of Reg. 4 (iv) on the lines quoted above, when the opportunity occurs.

It follows, then, that such a connection will become a " permanent and effective connection with earth " and for underground systems such as outlined in (1) single-pole fusing will only be admissible for the type of installation referred to, and for overhead systems in (2) the adoption of protective multiple earthing will also make installations fall within the same category.

Restriction of Appliance Manufacture

Disposal of Existing Stocks

IN the *Electrical Review* of July 10th (p. 46) particulars were given of Board of Trade's scheme for limiting the production of a number of domestic electrical appliances. The Board has now issued the Order giving effect to this—the Electrical Appliances (Control of Manufacture and Supply) Order, 1942 (S.R. & O. No. 1453; Stationery Office, 1d.). In this Order " manufacture " is defined as the assembling of parts to produce a complete, or substantially complete, article but does not include the assembling of parts for carrying out repairs. Although the Order covers appliances manufactured after July 31st it will not apply to firms which employ less than five persons in the actual production of the controlled goods until October 1st, 1942. It does not apply to direct Government orders.

Goods which were completed before August 1st may be supplied without restriction up to September 30th, and goods which were partly manufactured before August 1st may be completed and supplied within the same period without restriction. This does not apply to space-heating appliances which are controlled under the Limitation of Supplies (Heating Apparatus and Polishes) Order, 1942.

A manufacturer who supplies controlled goods made by another firm is required to keep separate records of each side of his activities.

Lighting Fittings

The supply by manufacturers of lighting fittings which were previously controlled under Class 9 of the Limitation of Supplies (Miscellaneous) Order is prohibited as from August 1st, with the exception of the following articles, of which the supply by manufacturers will be permitted: (1) Undecorated shades, bowls and globes of materials other than metal. These articles may be sprayed with one colour, and shades may be attached to a frame by braid, bastband, cord or other similar materials. (2) Undecorated table electric lamps of materials other than metal.

The supply of these " permitted " goods will be subject to a quota of 10 per cent. of supplies during the standard period which in this case will be the year ended May 31st, 1940. This means that during the six months' restriction period beginning August 1st, 1942, manufacturers may supply " permitted " goods to a value equivalent to 5 per cent. of their supplies in the standard period.

Manufacturers who hold stocks of " prohibited " goods which were completed on August 1st or which were already in process of manufacture on August 1st can apply to the Board of Trade, I.M.4, Millbank, London, S.W.1, for a licence to dispose of them in the home market. Manufacturers will, however, be permitted to supply " prohibited " goods freely for export.

The supply by manufacturers of illuminating glassware controlled in Class 9 whether of the " permitted " or " prohibited " type will be subject to the conditions outlined above. The manufacture of all forms of illuminating glassware with applied decoration will be prohibited on and after August 1st except under licence. Wholesalers may supply " prohibited " or " permitted " goods within the 10 per cent. quota. The supply of industrial lighting fittings will not be affected by the new regulations.

Copies of the Miscellaneous Goods (Prohibition of Manufacture and Supply) Order (S.R. & O. 1942 No. 1451) and of the Limitation of Supplies (Miscellaneous) (No. 16) Order (S.R. & O. 1942 No. 1510) may shortly be obtained from any bookseller or newsagent or direct from the Stationery Office, York House, Kingsway, London, W.C.2.

Inquiries in connection with these Orders should be referred to the Board of Trade, I.M.4, Millbank, S.W.1.

Forthcoming Events

Institution of Electrical Engineers.—*North-Western Students' Section.*—Saturday, August 22nd, Annual Summer Visit to Mosshall Farm, Cheshire. Applications for tickets (5s. for tea and dancing at Cottons Hotel, near Knutsford) should be made to Mr. J. B. Higham, 202, Davyhulme Road, Davyhulme, Manchester.

Institution of Electronics.—Saturday, August 22nd, 3 p.m. R.S.A., John Adam Street, Adelphi, W.C.2. Lecture on " Thermionic Emission with special reference to Oxide-Coated Cathodes," by Dr. Hilary Moss. Applications for tickets should be made to Mr. A. H. Hayes, 64, Winifred Road, Coulsdon, Surrey.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

The I.E.E. Council

I WISH to thank Mr. J. W. Thomas for expressing so concisely criticisms of matters that are causing considerable dissatisfaction among corporate members of the Institution. The attitude of the Council towards technical colleges is thoroughly unsatisfactory and by nominating Mr. W. C. S. Phillips for the recent Council election, some of use were hoping that technical education—apart from the universities—might have direct representation.

An aspect not mentioned by Mr. Thomas is the repeated re-election of the same persons. For instance, of the six official nominations this year, four had already served on the Council. Surely, the Institution is not so destitute of suitable fresh blood. It would appear that official nominations are more influenced by "big business" than by individual contributions to the activities of the Institution.

Brighton. EDWARD HUGHES, D.Sc., M.I.E.E.

A Switch Lampholder

MOST electricians are familiar with the design of switch mechanism illustrated, and may have spent much time in putting back the parts into the small space provided by the holder. In any case, it was always a "fiddling" job.

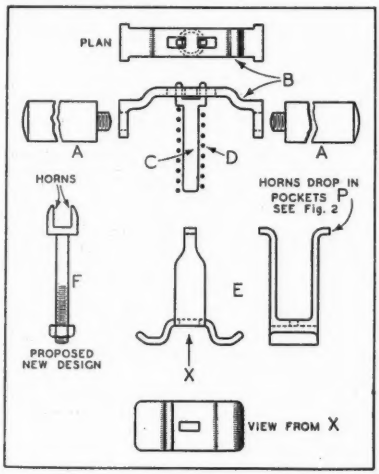


Fig. 1

A new design, F, with round stem screwed for a nut replaces the former piece of flat metal shown as C. A clear hole is drilled at the bottom of part E. When assembling the fitting, push the horns of F through B, and clinch just enough to prevent them from

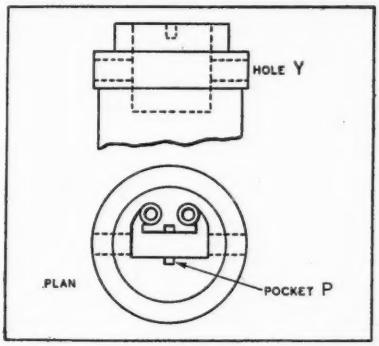


Fig. 2

falling out. Add spring D to shank, pass F through E, and screw on the nut to give the necessary tension. Drop the whole into the pockets in the lampholder; add parts A. By this means the assembly time can be cut to about one-tenth that requisite for ordinary designs.

BOUCHER.

The late Mr. F. B. O. Hawes

YOUR obituary notice (*Electrical Review*, August 7th) truly says that the late Mr. F. B. O. Hawes will be chiefly remembered for his work in organisation to which you refer. But it should not be forgotten that he had also done good work on the technical side of the industry. It seems a long time ago, since it ante-dates your record and "A. H. B's" sympathetic recollections.

In the 'eighties of last century Hawes was a member of the headquarters technical staff of the United Telephone Co. Here he gave evidence of zeal and ability (in part on record as switchboard history) which prompted his friends to regard his relinquishment of this appointment as a loss to the company and of doubtful advantage to himself, since his new work was of a non-electrical commercial nature. On the first point they were probably right. As to the second it may well be that the outside commercial experience was of value in his subsequent labours.

(*Continued at foot of page* 210)

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PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Cheltenham Borough Council is inviting applications for the position of borough electrical engineer which will shortly be vacant through the retirement of **Mr. W. J. Bache.** A salary of about £1,200 is offered but under the National Joint Committee agreement 85 per cent. of this will be paid for the first year, 92½ per cent. for the second and the full amount for the third and subsequent years.

Mr. W. J. Bache

Mr. Bache has been borough electrical engineer of Cheltenham since 1905. His father was a well-known Cornish engineer whose work took him to Spain. Mr. Bache was born in Madrid in 1874. He was trained at Faraday House, with the India Rubber, Gutta Percha & Telegraph Co., Ltd., Silvertown, and in the Leeds Electricity Department. After serving as charge engineer with the last-named undertaking from 1893 to 1899, he was appointed city electrical engineer of Gloucester, holding that position for about six years before going to Cheltenham.

Mr. Bache is a member of the I.E.E., and has been active in the affairs of the Incorporated Municipal Electrical Association of which he was president in 1937-38.

We wish Mr. Bache many years of happiness in his retirement.

Mr. W. H. Heaton, manager of the Witton Works of the General Electric Co., Ltd., for over thirty years, has retired, but will continue to serve the Company in an advisory and consultative capacity and on special work.

Mr. P. G. Brookes has been elected a director of Madras Electric Tramways (1904), Ltd., to fill the vacancy caused by the retirement of **Mr. J. Gray,** and is resigning his secretaryship in favour of **Mr. H. Pryor,** of Hays, Akers & Hays, who will from August 1st, provide the London offices of the company. Mr. Brookes is also resigning his secretaryship of the Electric Construction Co., Ltd., to take up an appointment with the Ministry of Supply.

Mr. E. A. Reynolds (Birmingham) has been elected a vice-president of the Electrical Contractors' Association, a position which he has already held. **Mr. E. W. Andrews** (Newcastle-on-Tyne) is another vice-president of the Association. He served an apprenticeship with Short Bros., Ltd., engineers and shipbuilders, and became assistant works manager to the company. In 1901 he joined F. Reid Ferens & Co., Ltd., and is now one of the senior directors of that concern. Among the installations carried out under Mr. Andrews' supervision is that in Durham Cathedral. The third vice-president of the E.C.A. is **Mr. Armistead Smith** (Bradford).

Mr. H. Hall, borough electrical engineer at Gillingham, Kent, has been elected chairman of the I.M.E.A. South East and East England Centre.

Mr. J. Morton, chief engineer of the West Midlands Joint Electricity Authority, who, as we reported in our May 15th issue, is retiring in September, has been presented by Alderman J. C. Tibbits (chairman), on behalf of the Authority, with an engrossed resolution, suitably bound, expressing appreciation of Mr. Morton's services. Ald. Tibbits spoke of the important part Mr. Morton had played as chief assistant to the late Mr. E. F. Hetherington, in the design of the Authority's power station.

Mr. Carleton L. Dyer, at his own request, has resigned from the board of the Philco Radio & Television Corporation of Gt. Britain, Ltd.

Obituary

Lieut. H. S. Collard.—We regret to announce that Lieut. H. S. Collard, R.E., of the sales staff of Siemens Electric Lamps & Supplies, Ltd., lost his life recently in this country through enemy action.

Mr. C. A. Carus-Wilson.—The death is reported, at the age of eighty-one, of Mr. Charles A. Carus-Wilson, M.A. Mr. Carus-Wilson was educated at Haileybury, Pembroke College, Cambridge, and Cooper's Hill where he took up electrical engineering. One of his first tasks was the installation of electric lighting in the Royal Palace, Bucharest, in 1882. Later, after serving for three years on the staff of Cooper's Hill, he went to McGill University, Montreal, as Professor of Electrical Engineering, a post which he held from 1890 until 1898 when he returned to England to practise as a consultant. He was on the staff of the Royal Naval College during the last war. Mr. Carus-Wilson had read papers before the Royal Society and the three premier engineering institutions and wrote "Electro-Dynamics," published in 1898.

Mr. T. Richardson, manager for the North area, Post Office telephones, died at Aberdeen on July 22nd, at the age of sixty. He began his career as district manager at Peterhead with the National Telephone Co.

Mr. F. S. Tooby, commercial manager of the Midland branch of Baldwins, Ltd., died on August 5th, at the age of sixty.

Col. Forrester Clayton, a member of the London Passenger Transport Board, died at Ealing on August 8th at the age of sixty-three.

Correspondence (*Concluded from page* 209)

In tribute to his memory—and perhaps as a matter of general interest—I think it should be known that it was on the technical and scientific side of the electrical industry that Hawes first gave evidence of the original thought and breadth of outlook which, together with an unfailing courtesy, were of value to the industry in wider spheres in later years.

Crawley Down, Sussex. J. E. KINGSBURY.

COMMERCE and INDUSTRY

Machinery Export Control. Orders for Welders.

Export Licensing

UNDER the Export of Goods (Control) (No. 32) Order, 1942 (S.R. & O. 1942, No. 1533, price 1d.) coming into force on August 24th, control is extended to cover additional metal manufactures and machinery. Licences will, in future, be required to export the following classes of goods, *inter alia*, to all destinations:—Cocks, taps, traps and valves, wholly or mainly of metal for controlling gases, liquids or vapours; fans, blowers and exhausters, power driven, and air washers, filters, dust collectors and dust separators ancillary thereto; pumps and compressors, wholly or mainly of metal; steam turbines and turbine condensers, and blade wheels, casings, diaphragms and rotors therefor; vacuum cleaners, non-domestic; and water turbines, and casings and runners therefor.

The existing licensing requirements with respect to electrical machinery are superseded by the provisions that licences will, in future, be required to export electrical goods of the following descriptions:—Busbars and busbar chambers; capacitors (condensers) of a rating of 1 KVA or over; control, regulating and starting gear for electric motors, generators, rotary convertors, rotary transformers, frequency changers, motor convertors, electro-magnets and electric furnaces; electric furnaces; fuses; motors, motor convertors, frequency changers, generators, generating sets, rotary convertors and rotary transformers; rectifiers, switchboards and fuseboards and pillars (including distribution boards and pillars); switches and circuit-breakers; static transformers of a rating of 1 KVA or over; and transformer tanks.

The existing control has been extended to cover all kinds of mechanically propelled vehicles. Copies of the Order (price 1d.) will be available shortly from the Stationery Office or through booksellers.

War Research and Development

A group of M.P.s of all parties, headed by Capt. L. F. Plugge, is to put forward a motion in the House of Commons calling for the establishment of a whole-time Central Scientific and Research Board to encourage and co-ordinate the endeavours of technicians and scientists to play their full part in the war.

Welding Machine Control

In order to ensure a balanced supply of resistance welding machines no order, received on or after July 27th, may be accepted by a manufacturer or an agent for a new resistance welding machine unless authority from the Machine Tool Control has first been received. All Government Departments are being advised that if they require resistance welding machines they must first submit the particulars of their requirements to the Control which will inform the Department of the name of the supplier who is being authorised to execute the order. The supplier in turn will be advised of the authorisation. In the event of an order being sent to a manufacturer direct without such authority he should advise the customer to make application to the Machine Tool Control, or write direct to the Control for instructions. The Control will not issue the actual orders but will authorise the placing of such orders.

Scientific Films

How the training of technicians can be speeded up by exhibitions of instructional films in the factories, technical institutes, in civil defence units and in the armed forces will be dealt with by Dr. J. A. Lauwerys at the first conference on scientific films arranged by the Association of Scientific Workers for August 16th at the Institute of Mechanical Engineers, Storeys Gate, St. James Park, Westminster.

Repairs to Consumers' Installations

A report by the chief electrical engineer and manager of St. Pancras on the desirability of the Electricity Department repairing consumers' installations was recently considered by the Electricity and Public Lighting Committee.

The engineer pointed out that it was often necessary to draw consumers' attention to defects in their installations which might cause interference in the supply to adjacent consumers or a leakage and waste of energy, and constituted a danger to the inhabitants. In such cases the consumers were required to have the defective wiring repaired or replaced by an electrical contractor, but at the present time

Despite being buried under bomb debris for over three months this Premier kettle found at Manchester still functions and will in fact boil just sufficient water for a cup of tea

consumers were finding it difficult to get the work done owing to the limitation of supplies of electrical accessories and the shortage of man-power. On many occasions they had appealed to the Department to undertake the work in consequence of contractors being unable to promise early fulfilment, but the Department was not authorised to accede to these requests. The consumers' position would now be worsened by the fact that under the Order issued by the Minister of Fuel and Power prohibiting the waste and uneconomical use of electricity, failure to maintain equipment in a serviceable condition would be regarded as uneconomical use and therefore an offence. He considered that in the public interest it was desirable for the Department to render all possible service to consumers experiencing difficulty in maintaining their installations in a safe and serviceable condition.

The Committee recommended that while the difficulty existed the Department should be authorised to undertake any essential repairs to consumers' installations at the terms usually charged for other kinds of rechargeable works, providing the necessary materials and labour were available.

Rapid Service

A fire occurred recently in the engine-house basement of a colliery in the West Riding of Yorkshire. Discovery of the outbreak was first made by the driver of the electric winder, who brought the machinery safely to rest and gave the alarm. Unfortunately, by that time it was too late to prevent irreparable damage to the large high-voltage reversing contactor panel situated in the area of the fire and the winder was put completely out of service.

Metrovick representatives were called in and found that the h.v. reversing panel was completely gutted and temporary repairs were quite out of the question. Replacement of the panel would normally have taken several months, but by prompt action and adaptation at the works a complete new panel with associated apparatus of a somewhat different type was put on the road within about 40 hours of the shut-down. Twenty-four hours later the new equipment was erected on the site of the original panel, the damaged cables repaired and connected, and the auxiliary wiring and signalling circuits restored. Preliminary tests being satisfactory, the installation was put into commission, and within sixty-six hours of the accident the winding plant was again doing its full duty of raising nearly 1,000 tons of coal per day.

New displays at the G.E.C. headquarters at Magnet House, Kingsway, W.C.2

Topical Window Displays

Once again the front of Magnet House, Kingsway, London, W.C.2, the head office of the General Electric Co., Ltd., is being used in the national service. The keynote of the present displays is "Save." Covering a total area of approximately 170 sq. ft., the four frontage displays are given over in support of the "Save Fuel" campaign. Simple and bold in conception they exhort economy in fuel, and by ghosted outlines of various domestic electric appliances, suggest ways and means by which fuel can indirectly be conserved. The fifth display, which occupies the doorway of 59, Kingsway (the peacetime entrance to the G.E.C. showrooms) is shown in the centre of the accompanying composite illustration. It is self-explanatory and direct in appeal.

Fluorescent Lighting of Exhibition Photographs

The daylight qualities of fluorescent lighting are to be seen to good effect at an exhibition of war photographs which *Illustrated* is holding at Dorland Hall, Regent Street, London, this month in aid of the Red Cross. The exhibition is entirely lighted by 80-W fluorescent lamps, this being, we believe, the first example of the large-scale use of these lamps for such a purpose in this country. The effect is remarkably good and the use of this form of illumination avoids the unpleasant reflections from photographic surfaces noticed in similar exhibitions in the past when filament lamps were used. An impression of depth in the pictures is also achieved.

Rubber Control

The Ministry of Supply has made the Control of Rubber (No. 15) Order, 1942 (S.R.& O. 1514, 1942 ; 1d.). This revokes Article 4 of the No. 7 Order, the whole of the No. 6 Order, and Article 2 of the No. 13 Order, although it is stated that licences granted under the last two Orders will still be valid.

The Order provides that no person shall treat, use or consume any controlled material except

under licence. Controlled material means crude, reclaimed and synthetic rubber, gutta percha and balata, but excludes trimmings, strippings and dust. Synthetic rubbers mean bunas, butyls, thiokols and chloroprenes. The Order came into effect as from August 3rd.

Restricted-Hour Tariffs

The Electricity Commissioners, in a memorandum to electricity undertakings, draw attention to the necessity of ensuring that adequate supplies of power are available for vital war needs during the period of maximum demands on the grid system in the winter months, for which purpose it is essential that all possible steps should be taken to restrict unnecessary demands at that time. In all grid areas the winter maximum demand occurs between the hours of 8 a.m. and 12 noon, and is fairly constant throughout that period. The Commissioners accordingly suggest that undertakings which have offered to consumers special tariffs for supplies during restricted hours should review the operation of such tariffs, and that wherever it is practicable steps should be taken before next winter to modify the application of such tariffs so that the special rates do not apply to any supplies taken between the hours of 8 a.m. and 12 noon during the months of December, January and February.

Accounting Staffs

Writing to *The Times* regarding the recent report of the Committee of Public Accounts Sir Ronald Matthews, chairman of the Brush Electrical Engineering Co., Ltd., stresses the need for proper costing systems if the maximum production is to be obtained at the minimum outlay of taxpayers' money. In this connection he draws attention to the depletion of trained accounting staffs by the demand for manpower and the burden thrust upon those who remain by the investigations and queries of Government Departments.

Sir Ronald says the stage has been reached when a careful balance must be struck between the accounting requirements of the Government Departments and the staff available to supply them. The Departments are overstaffed compared with the producers. It is a question now of leaving the staff with the producers or cutting down drastically the departmental statistics and investigations. One or other must be done, and this is a question of major policy which requires the urgent attention of the Committee.

Irish Cable Duties Suspended

The Government of Eire has decided to suspend duties on certain electric wires and cables up to the end of the current year and continue the suspension of duties on certain copper tubing, pipes, and piping, and on dry batteries and their component parts until the same date.

E.A.W. Home Workers' Certificates

The E.A.W. has sent us particulars of courses which it has prepared for home workers with the object of teaching the use of domestic electrical equipment and preparing women to equip and run an electric home wisely and economically. The Association will conduct examinations by arrangement and will award certificates to those who attain a recognised standard of knowledge. The course for housewives includes practical and theoretical instruction and consists of ten lectures. For students, the Association is prepared to assist those who wish to arrange courses of training for schools and youth organisations, and will arrange examinations. The "Councillor Miss Walter" rosebowl will be awarded to the school which obtains the highest average marks during the school year.

Boy Fined for Causing Short-Circuit

At Birkenhead a boy of fourteen was fined 5s. and ordered to pay £5 compensation for having thrown a bar of iron on the Mersey electric railway line causing a short-circuit which blew out a relay cabin causing damage of £57. As a result four men had to work all night to rectify the fault as the signalling system was put out of action.

Radio Data

In selecting the data contained in a 60-page booklet entitled "Reference Data for Radio Engineers" the guiding principle was the needs of the staff of Standard Telephones and Cables, Ltd., whose experience has covered almost every sphere of wireless communication. Though necessarily limited in its scope, this compilation of formulæ and a variety of graphical and tabulated information is an endeavour to remedy the lack of sources that can easily be referred to in all ordinary emergencies. It is desired particularly to draw attention to the inclusion of tables of Bessel functions, the need for which has grown so rapidly in recent years in connection with phase and frequency modulation systems. In making this booklet more generally available the company hopes it may be as useful to other engineers as it has proved to be within its own organisation.

Trade Announcement

The Electric Construction Co., Ltd., is closing its emergency office at Lamport Hall, Northampton, and as from August 17th its registered office will be at the company's Bushbury Works, Wolverhampton.

TRADE MARK APPLICATIONS

THE following applications have been made for British trade marks. Objections may be entered within a month from August 5th:—

DURAFLAT and DURAFLEX. Nos. 619067 and 619068 respectively, Class 9. Insulated electric conductors.—Duratube & Wire, Ltd., 16, Hanworth Road, Feltham, Middlesex.

RIPPLELITE. No. B613621, Class 11. Lighting fittings.—Holophane, Ltd., Holophane House, Elverton Street, London, S.W.1.

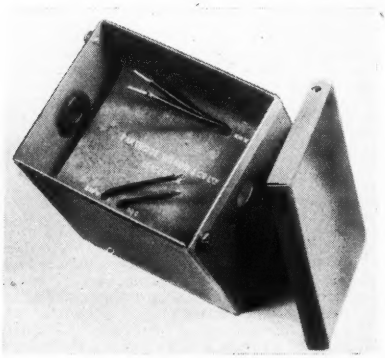
HELSYN (design). No. 618839, Class 17. Synthetic rubber sleeves for electric insulating and identification purposes.—Hellermann Electric, Ltd., Goodtric Works, Brewer Street, Oxford.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

"Utility" Transformers

THE demand for small low-priced transformers for such purposes as air-raid shelter lighting has resulted in PARTRIDGE, WILSON & CO., LTD., Davenset Works, Evington Valley Road, Leicester, developing a special



Transformer for air-raid shelter lighting, etc.

"utility" model from which unnecessary "frills" in design have been eliminated.

The transformer proper, mains/12 V, 100-VA output, is a standard product, but instead of the normal mounting and finish, it is placed in the bottom of a 5¼ in. by 5¼ in. by 4¼ in. metal box container, and completely covered by pouring in a suitable sealing compound. The surface of the compound is protected by an inner presspahn cover, which also bears the necessary identification marks for the connections.

The leads from the transformer are carried through the inner cover and left ready for connecting up as the user wishes, no terminals being provided normally. With the metal top fixed on, the whole unit is compact and shock, heat and weather proof. The adoption of compound filling results in a considerable saving in both materials and the time taken in production, as well as reducing the cost.

Although 100 VA has so far proved to be the most popular rating, a range of outputs from 25 to 250 VA is available.

Loop-in Service Fuses

Most supply engineers are already familiar with the advantages of loop-in "ISCO" service fuses when used for house service connections. Service fuses of this type were required for a recent contract for outdoor installation. As a result the "ISCO C.D." unit has now been made available by the manufacturers, W. T. HENLEY'S TELEGRAPH WORKS CO., LTD., Milton Court, Westcott, Dorking.

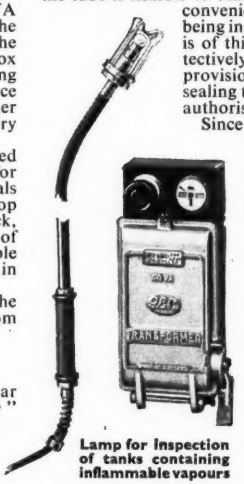
This new outdoor loop-in service fuse consists of a cast-iron weatherproof box with two universal type wiping glands suitable for up to 0.06 sq. in. twin p.i.l.c. and a. cables. The top of the box can be tapped for conduit outlets (maximum 1¼ in.) or can be made to receive stuffing glands. Service fuses of the rewirable or cartridge fuse type can be supplied suitable for maximum working currents of 30 or 60 A in conjunction with loop-in fittings of the disconnecting or non-disconnecting type, as provided in indoor "ISCO" units.

Tank Inspection Lamp

For properly inspecting the interiors of tanks and cylinders it is necessary to use a portable handlamp that is small enough in diameter to be inserted through the filling hole and so constructed as to avoid any risk of explosion should the tanks have contained inflammable liquids.

For this purpose the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, has produced a low-voltage handlamp that is energised from a step-down transformer with which are combined a switch and special socket for a plug outlet. It has been approved by the Home Office authorities for the inspection of aeroplane tanks, distillery vats and similar containers.

A small well-glass inside a wire guard encloses a 6-V "Osram" lamp of 3-W standard bayonet-cap type, mounted at the end of a tube about 3 ft. long and provided with a handle. Part of the tube is flexible so that it may be bent to any convenient angle inside the tank being inspected. The well-glass is of thick gauge and it is protectively toughened, while provision has been made for sealing the lamp to prevent unauthorised interference with it.



Lamp for inspection of tanks containing inflammable vapours

Since the transformer is designed to provide an intrinsically safe output current, a spark caused by a fault, either within the handlamp itself or its connecting leads, will not be strong enough to ignite any surrounding gas. Two lamps may be used simultaneously from the one transformer if so desired.

Trough Reflectors

A fresh series of trough reflectors, designed to mitigate the "tunnel effect" observable in some installations employing 80-W fluorescent tubular lamps, is announced by the GENERAL ELECTRIC CO., LTD. These reflectors have an open top, so permitting some light to escape upward; the amount of steel used in their construction is less

than has been needed for previous models and they are less expensive than their prototypes.

Three forms are available: Model F.16955 is fitted with a control unit (F.16971) consisting of an 80-W open-type choke with 10-V tappings and, in an additional compartment, the starting switch and radio suppressor, arranged as one complete unit that is housed on top of the reflector. The F.16954 reflector and control unit has an additional power factor correction condenser (F.16841), the complete auxiliary gear being bolted to the reflector. To the F.16956 reflector is bolted a metal box containing the starter switch and radio suppressor only.

Each form is fitted with two loops at 24-inch centres for suspension by chains. A small hook with a clearing hole is also provided so that if desired conduit suspension can be employed.

Argentine Electrical Market

Increase in Local Production

THE Argentine Government has published foreign trade returns in a summarised form for the first nine months of 1941. The values of the imports of electrical goods during that period are given below, together with a note of increases or decreases compared with Jan.–Sept., 1940. They show reductions, heavy for the most part, in all items except telephone cables, radio sets and glass bulbs for lamps and valves, these bulbs being imported for the local lamp and valve factories which have been increasing their production for some time.

It cannot be said to what extent the comparison of values shown holds good in respect also of quantity. For one thing, since July, 1941, the Argentine statistical authorities have changed the basis of valuation. Formerly, they laid down certain fixed values or "estimated real values," but now invoice values are the basis. Another factor which vitiates comparison is the rise in price which took place between 1940 and 1941. The main reason for the decrease is no doubt the difficulty of obtaining imported goods owing to interference with shipping and prior claims on the electrical engineering industries of the usual supplying countries.

IMPORTS INTO ARGENTINA

	1st 9 mths. 1941 Thous. Pesos	Inc. or dec. on 1st 9mths. 1940 Thous. Pesos
Motors and dynamos over ¼ HP and parts	952	− 560
Electric cables of copper	2,201	−1,875
Telephone cables and accessories	3,860	+ 890
Battery and accumulator parts	1,039	− 74
Batteries	40	− 79
Jars for accumulators and batteries	56	− 130
Glass bulbs for lamps and valves	435	+ 111
Radio-telephone apparatus	87	− 90
Radio receiving sets	1,996	+ 21
Other telephone apparatus and accessories	747	− 127
Switches, circuit-breakers, cut-outs, etc.	286	− 373
Change-over switches for telephone installations, etc.	442	− 269
Lamps	547	− 649
Torches	74	− 220
Irons	1	− 73
Insulating tubes	4	− 14
Other electrical goods	2,864	− 147
Loudspeakers	111	− 278
Parts for radio installations	1,481	− 865
Meters	1,258	− 672

Local manufacture has been developing and figures have been made known for 1939 which it is interesting to compare with those of 1935, the year when corresponding figures relating to electrical goods were first published in any detail. Such items are as follows:—

	1935 Value made. Thous. Pesos	1939 Value made. Thous. Pesos
Repair of motors, including manufacture of spare parts, coils, etc.	1,311	1,895
Electrical goods and apparatus, unspecified	10,877	24,251
Including :—		
Ice-cream makers	2,190	6,063
Refrigerators	—	126
Cookers	195	1,091
Heating appliances	78	426
Irons	—	172
Fans	—	106
Cooking appliances	—	62
Drying machines	—	155
Unspecified apparatus	492	393
Wires and cables	3,198	5,217
Lamps	228	2,171
Accumulators	1,834	2,362
Batteries	—	1,757
Meters	—	1,000
Accessories and parts	2,925	3,121
Insulating tape	—	163
Radio apparatus repair and manufacture of parts	9,838	15,477
Including :—		
Sets	6,782	10,512
Coils	199	783
Loudspeakers	718	437
Transformers	394	429
Valves	—	800
Condensers	—	300
Eliminators	—	387
Dials	—	198
Complete chassis	—	257
Amplifiers	—	63
Transmission equipment	—	365
Dry cells	879	—
Other parts	1,025	—

[The rate of exchange for the peso may be taken as 17 to the £.]

"Hydro News"

THE June issue of the official organ of the Hydro-Electric Power Commission of Ontario marks the beginning of a new and more attractive form of presentation. The *Bulletin*, first published 28 years ago, has given place to *Hydro News*, a bright and excellently illustrated publication. It bears a front cover picture (by Mr. H. Mackay, a member of the Commission's staff and a noted photographer) depicting the new 220-kV double-circuit tower line between Leaside and Burlington with the caption "More Power for Victory," symbolic of Canada's war effort. An introductory message is contributed by Dr. T. H. Hogg, the Commission's chairman and chief engineer.

London J.E.A.

Agreement with Central Board

AMONG the matters reported to the London and Home Counties Joint Electricity Authority at its meeting last week was a scheme of wartime arrangements for generating stations operated under the direction of the Central Electricity Board.

Heads of agreement recommended by a joint committee of the Board and the Electricity Supply Associations showed that the objects of the scheme were to ensure to authorised undertakers owning generating stations operated under the Board's directions a right to recover from the Board capital charges attributable to their stations; to protect such undertakers in respect of the prices payable by them to the Board for supplies during total or partial immobilisation of their stations from any cause; and to ensure the support, as far as practicable, by those authorised undertakers of the Board's finances against deficiencies being occasioned by the war.

The Technical Committee reported that the scheme was discussed at a conference, held on July 30th, of representatives of the Authority and the borough councils of Barnes, Finchley, Guildford, Hammersmith, Hornsey, Islington, Kingston and Wimbledon. The questions discussed were: Did the Authority and the local authorities affected agree that they should be brought within the terms of the arrangement; and, if so, what alterations, if any, should be suggested on the draft heads of agreement? The Committee considered that certain views expressed by some of the representatives should be submitted to the C.E.B., and that it was advisable to press for drafting amendments. Subject to these points the proposals should be accepted.

The Woking Undertaking

Regarding the Woking Electricity Supply Co.'s application to the Commissioners for an Order extending the time within which rights of compulsory acquisition of its undertaking by the J.E.A. and other authorities might be exercised, the General Purposes Committee reported that it had given the necessary instructions as to the representations to be made to the Commissioners. Under the company's 1900 Order, the J.E.A. may purchase part of the undertaking within six months after the expiration of forty-two years.

Proposals were made by the General Purposes Committee for protecting the interests of employees whose services were no longer required owing to present restrictions. It was felt that they would be least prejudiced if they were given leave of absence, in appropriate cases, to join the Forces or take up other work of national importance. By these means they would benefit by the resolutions passed by the Authority in regard to such cases. It was suggested that two weeks' preliminary notice of leave of absence with pay should be given, and leave of absence would thereafter take effect in cases where employees had joined the Forces or taken up national work, otherwise a final week's notice with pay would be given. Employees granted leave of absence would benefit from the conditions as to superannuation, reinstatement, etc., and, in the case of those joining the Forces, making up of civil pay.

Fuel Economy

Help for Industrialists

THE Minister of Production has addressed an appeal for fuel economy to the managing directors of 30,000 industrial undertakings all over the country in which he stresses the urgency of the matter, and asks for their full support in bringing about the essential saving.

A note by the Ministry of Fuel and Power is enclosed drawing attention to a number of considerations and making practical suggestions. It is pointed out that the country is faced, for some time to come, with a serious shortage of coal, including the high-quality sized and cleaned coals which have become popular with the development of special types of firing plant.

However efficient distribution may be, the maintenance of industrial production will depend on improved methods of fuel consumption, resulting in a decreased demand, and on the increased use by industry of the types of fuel not at present in general demand, of which supplies are less short.

Courses and Demonstrations

On the advice of the Minister's Fuel Efficiency Committee, and in collaboration with the Board of Education, discussion courses for management staff and demonstrations for boiler house operatives have been arranged at technical colleges and universities in about forty industrial areas. Any firm that has not already done so is urged to participate in these training schemes, details of which can be obtained from the Ministry of Fuel and Power.

Trade associations and research organisations have been asked by the Fuel Efficiency Committee to examine the most promising methods of obtaining economies in their particular industries, and industrial undertakings consuming coal in any quantity are asked to arrange to secure the services of a combustion expert to concentrate his attention on this problem.

The advice of the regional staff of the Ministry, which includes independent combustion engineers, is readily available to assist consumers with their fuel problems. No change in any firm's fuel-using plant should be contemplated without consultation with the Ministry's Regional Officers.

Finally, it is urged that all managements should, in the national interest, make arrangements at once to accept at least part of their coal in a lower grade than those normally supplied.

Guildford Fuel-saving Week

Major Lloyd George opened an exhibition at Guildford on Saturday last designed to instruct consumers of gas and electricity in ways of getting the most from their appliances with the least consumption. The exhibition is one feature of a Fuel-Saving Week organised by the Corporation.

Readers may recall that Mr. W. E. Affleck, the borough electrical engineer, ran a " Cut off the Peak " campaign towards the end of last year with the dual object of securing economy in consumption and a reduction in bulk supply charges.

ELECTRICITY SUPPLY

Croydon Showroom Co-operation. Luton Rebate.

Bolton.—VIEWS ON MINIMUM CHARGES.—At the Town Council meeting on August 6th, Alderman W. W. Tong congratulated the Electricity Committee on suspending for the war period the minimum charge of 30s. a year. The total cost would be only £500 a year, he said, so really there would have been no great hardship on the Electricity Department if the charge had been removed earlier. Councillor T. P. Longworth, chairman of the Electricity Committee, said that the Department would lose more than £500 a year, because the charge had been removed to encourage economy. It was originally introduced to cover charges for service, such as reading of meters, etc., and it would have to be reimposed after the war.

Croydon.—JOINT USE OF SHOWROOMS.—To economise in light and fuel and release men and women for war work the gas showrooms at Coulsdon are being closed and the business will in future be transacted at the electricity showrooms. Inversely, the electricity showroom at Caterham will be closed and the business dealt with at the gas showrooms. A notice is being sent to each consumer affected in the areas served by the County of London Electric Supply Co., Ltd. and the Sevenoaks and District Electricity Co., Ltd. in so far as their districts coincide with the area supplied by the Croydon Gas Co. This gives further particulars regarding arrangements made in other areas for the payment of accounts, for example, in the Selsdon and Beddington areas.

Glasgow.—SUPPLY TO TEA ROOMS.—It was suggested by the Ministry of Food that the Corporation should bear part of the cost of laying an electricity supply cable to serve a pavilion and tea rooms, and the Parks Committee has recommended that on the understanding that the cable would cost approximately £700 a fixed contribution of £300 should be made by the Corporation.

POWER FROM REFUSE.—Having heard a report by the director of cleansing with regard to the output of electricity from the Govan refuse power works, the Cleansing Committee has referred the whole question to a special sub-committee for consideration and report. Among proposed improvements at the works approved by the Committee at the same meeting was the installation of an electric boiler to improve the washing facilities, the estimated cost being £125.

Huddersfield.—" POOLED " REPAIRS.—The Town Council has approved a scheme of the Mutual Aid Group, No. 2 Area (Huddersfield and Halifax) under which all cooker hot-plate repairs for the distribution authorities joining the scheme are to be undertaken by the Huddersfield Corporation Electricity Department.

Luton.—SUBSTANTIAL CONCESSIONS.—A rebate of 15 per cent. is to be given to all consumers in the borough, other than those supplied under the industrial two-part tariff, who will receive a separate notification at an early date. Quarterly consumers will receive a credit note for the amount involved with their accounts for the half-year ending September 30th ; there will be no meter reading for the quarter ended June 30th. Prepayment meter consumers will be given the rebate due at the time of the next meter clearance. In the case of outlying districts the additions to basic tariffs are to be reduced to 5, 5 and 12½ per cent. where the existing additions are 10, 12½ and 20 per cent. and there will also be a 10 per cent. rebate. The reductions in percentage additions will continue throughout the year ended March 31st next and the rebates will apply to the first and second quarters and will be subject to review quarterly thereafter. In the notice outlining the concessions Mr. Rennie Dean, the general manager and chief engineer, urges consumers nevertheless to continue to exercise every economy in the use of electricity.

London.—ST. PANCRAS.—Sanction has been received by the Electricity Committee to a loan of £2,000 for meters.

Mansfield. — LOAN. — The Electricity Committee has received sanction to a loan of £1,500 for mains and services.

Northern Ireland.—DEBATE ON ELECTRICITY BILL.—The Electricity (Emergency Supplies) Bill, which has already passed through the Ulster House of Commons, received its second reading in the Senate on August 6th. The *Belfast Telegraph* reports that during the debate Major Dobbs said he hoped the Ministry of Commerce would take the long view, and that eventually all companies and bodies dealing with the distribution of electricity would also be amalgamated.

The Leader of the House (Mr. J. H. Robb, K.C.) emphasised that the Bill was purely a wartime measure and did not make any provision for machinery for the supply of electricity after the war.

Senator Cunningham, speaking on the clause dealing with deficiencies which might arise, said Belfast was not likely to be the cause of any such deficiencies, and he thought the question of proportioning should not be in the hands of the Ministry of Commerce, but left to an arbitrator.

Senator Leslie mentioned that one urban council had written to the Ministry taking exception to a clause in the measure and the Ministry's reply as published in the newspapers did not correspond with the terms of the Bill.

Replying to the debate, Mr. Robb said the view was held that the Ministry were the persons who had the best information as to how the charges should be apportioned. He did not think that in practice any real difficulty would arise.

Northumberland.—SCHOOL LIGHTING.—The County Education Committee is to install electric lighting at Hauxley Radcliffe school at £115.

Scarborough.—OPERATION OF POWER STATIONS IN WARTIME.—The Town Council has approved in principle the agreement to be made between owners of generating stations and the Central Electricity Board providing for wartime operating conditions.

Southport.—MINIMUM CHARGE RETAINED.—The Electricity Committee has decided against the abolition of the minimum charge. The chairman denied that this was an irritating charge, and said it was well justified by present-day conditions.

TRANSPORT

Darlington.—WOMEN DRIVERS.—The Corporation has approved a recommendation for the training of women trolley-bus drivers. Single-decker buses are used exclusively.

Grimsby.—TROLLEY-BUSES.—When the operations of the Transport Department were recently reviewed it was stated that there was a profit on the year's working. Mr. J. C. Whiteley, engineer and manager, reporting on the difficulty of obtaining spares, said they had got to the stage when they had to take one vehicle down to provide spare parts for others. They required six trolley-buses immediately to replace obsolescent vehicles.

Newcastle-on-Tyne.—TRANSPORT PROBLEMS.—A difficult position after the war has been foreshadowed by Alderman R. Mayne, chairman of the City Transport and Electricity Department, in view of the fact that the vehicles are ageing but cannot be replaced. Some vehicles have been borrowed from south-country authorities to meet the strain on the services.

The Committee has decided not to employ women trolley-bus drivers as the double-deckers used are considered too difficult for them to handle.

Southend-on-Sea. — TRANSPORT CO-ORDINATION.—Negotiations are proceeding between Westcliff Motor Services, Ltd., and the Southend Corporation transport undertaking with a view to co-ordinating the two services now operating in the borough. It is felt that such co-ordination would not only provide better travelling facilities for the public, but would effect economies in fuel and man-power.

France.—RUBBER-TYRED RAILCAR.—A rubber tyred electric railcar has been in service on the Paris suburban lines for the past twelve months, and operation is reported to have been satisfactory, states *Modern Transport*. The weight (32 tons when empty) is carried by sixteen sets of wheels arranged in four bogies. The live axles have no flanges and show a pressure of 3.84 tons. There are 136 seats and standing room for another 120 passengers. A typical eight-axle, two-car electric unit of orthodox type mounted on metal wheels has 130 seats and room for 167 standing passengers, but its weight is 97½ tons when empty. The saving in weight is thus very considerable and amounts to some 40 per cent. per passenger.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Telegraph Condenser Co., Ltd.—At last week's annual meeting the chairman (Mr. W. H. McFadzean) stated that a controlling interest in the company had been acquired by Control Nominees, Ltd. He also said that careful consideration would be given to a suggestion that ordinary and preference shareholders should be given independent representation on the board.

The London Electric Supply Corporation, Ltd., has announced the payment of the interim dividend of 3 per cent. on the 6 per cent. preference shares.

The City of London Electric Lighting Co., Ltd., is again paying an interim ordinary dividend of 3 per cent., less tax.

The Northmet Power Co. has declared an interim dividend of 3 per cent. (same) on the ordinary stock, less tax.

The Farnham Gas & Electricity Co. has declared an interim dividend of 3½ per cent. (against 3⅛ per cent.).

Philco Radio & Television Corporation of Great Britain, Ltd.—In presenting the report and accounts at the annual meeting on August 6th, the chairman (Mr. L. D. Bennett) said that the growing resources of the company now enabled them to engage in technical research and development. So far as it was possible post-war planning entered into their deliberations and they were learning lessons that would be of value in building up their technique for post-war activities. It was imperative that the radio and associated industries should take the necessary preliminary steps to ensure national and stable trading conditions after the war.

West of England Electric Investments, Ltd., are maintaining the dividend at 7 per cent. The net income for 1941–42, after meeting taxation, was £60,831, against £69,599.

The Engineering & Lighting Equipment Co., Ltd., has announced a final dividend of 6 per cent., making 10 per cent. for the year (same).

Thorn Electrical Industries, Ltd., are again paying a dividend of 20 per cent. for the year.

The United River Plate Telephone Co., Ltd., is maintaining the year's distribution at 6 per cent. by the payment of a final dividend of 3 per cent.

The Cawnpore Electric Supply Corporation, Ltd., reports a net profit for 1941 of £107,919, as compared with £96,692 for the preceding year. The final ordinary dividend is 7 per cent., again making 10 per cent. for the year.

The British Columbia Electric Railway Co., Ltd., reports net earnings of £334,472 for 1941 (against £339,555 for the preceding year). Final dividends of 3 per cent. on the preferred ordinary and 5 per cent. on the deferred ordinary are paid, maintaining the distribution at 6 and 8 per cent. respectively. There was an increase from 76,411,790 to 83,996,509 in the number of passengers carried while the freight hauled rose from 487,173 to 723,479 tons. The sales

CONTROL

by

THE VERITY RANGE

AC *Direct On,*
Star Delta,
Rotor and Stator,
Air or Oil Break.

DC *Starters,*
Control Panels,
Constant or Variable
Speed.

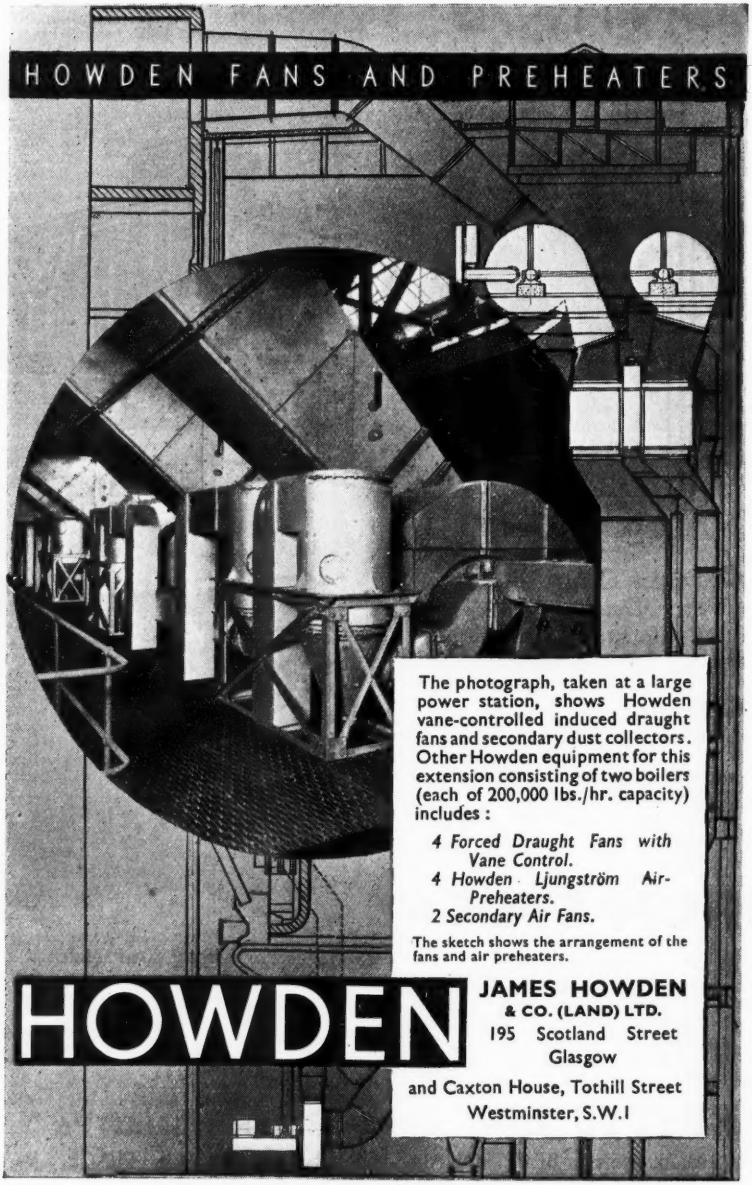
FROM STOCK

or in few days from receipt of particulars

Air Break Star Delta
with Triple Pole Isolator

VERITYS LTD. ASTON, BIRMINGHAM 6

Sales Headquarters : BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2



The photograph, taken at a large power station, shows Howden vane-controlled induced draught fans and secondary dust collectors. Other Howden equipment for this extension consisting of two boilers (each of 200,000 lbs./hr. capacity) includes :

4 Forced Draught Fans with Vane Control.
4 Howden Ljungström Air-Preheaters.
2 Secondary Air Fans.

The sketch shows the arrangement of the fans and air preheaters.

HOWDEN

JAMES HOWDEN & CO. (LAND) LTD.
195 Scotland Street
Glasgow
and Caxton House, Tothill Street
Westminster, S.W.1

of the light and power system increased from 486 to 521 million kWh.

Waygood-Otis, Ltd., is paying an interim dividend of 10 per cent., as last year.

Gabriel, Wade & English, Ltd., are maintaining their ordinary dividend at 6 per cent. and bonus at 4 per cent. The net profit was £74,734, against £88,372.

New Companies

Bettman & Kupfer (London), Ltd.—Private company. Registered July 31st. Capital, £100. Objects: To carry on the business of manufacturers of and dealers in electrical, wireless and engineering apparatus, instruments and parts, pressed and moulded goods, etc. Directors: S. Kupfer, 28, Lillington Road, Leamington Spa, and M. D. Green, 129, Meadway, Barnet, Herts. Registered office: 26, Stoney Street, Nottingham.

Cleveland Electrical Co., Ltd.—Private company. Registered July 23rd. Capital, £5,000. Objects: To carry on the business of electrical, mechanical and radio engineers and contractors, electricians, wiring specialists, etc. Subscribers: E. Smith, 100, Stratford Court, W.1, and S. R. Bright, 289, White House, N.W.1. Registered office: Threeways House, Clipstone Street, W.1.

J. S. Engineering Co., Ltd.—Private company. Registered July 28th. Capital, £500. Objects: To acquire the business of a general and electrical engineer and oxy-acetylene and electrical welder carried on by J. S. Whitton at 23a, Clifton Road, and 1a, Station Road, S. Norwood, as the J. S. Engineering Co. Directors: R. S. Whitton and Annie M. Whitton, both of 46, Farnley Road, S.E.25, and R. Whitton, 27, Sundial Avenue, S.E.25.

Marron Electrical Products, Ltd.—Private company. Registered August 1st. Capital, £2,000. Objects : To carry on the business of manufacturers and repairers of, and dealers in, artificial lighting apparatus, electrical and gas plant, fittings and accessories, wireless sets and components, ventilating and cold storage plants, plastic moulding, etc. Directors : E. S. Martin, A. E. Martin and R. Martin, all of 172a, Blackstock Road, N.5. Registered office : 172a, Blackstock Road, N.5.

Companies' Returns

Statements of Capital

General Cable Manufacturing Co., Ltd.—Capital, £150,000 in 150,000 preference shares of 10s. each and 300,000 ordinary shares of 5s. each. Return dated January 3rd. All shares taken up. £85,000 paid. £65,000 considered as paid. Mortgages and charges: Nil.

Denman's Electricity, Ltd.—Capital, £1,500 in 500 preference shares of £1 each, and 20,000 ordinary shares of 1s. each. Return dated March 30th. 300 preference and 20,000 ordinary shares taken up. £300 paid. £1,000 considered as paid. Mortgages and charges: Nil.

British Short-Circuit Testing Station, Ltd.—Capital, £10,000 in ordinary shares of £1 each. Return dated April 30th, 1942. 302 shares taken up. £302 paid. Mortgages and charges: Nil.

Increases of Capital

Switchgear Accessories, Ltd.—The nominal capital has been increased by the addition of £1,000, in £1 ordinary shares, beyond the registered capital of £1,000.

Electroway Heaters, Ltd.—The nominal capital has been increased by the addition of £2,000 beyond the registered capital of £3,000. The additional capital is divided into 2,000 6 per cent. preference shares of £1 each.

Mortgages and Charges

Giffens, Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated July 15th, 1942, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Nigerian Electricity Supply Corporation, Ltd.—Satisfaction to the extent of £11,437 on June 30th, 1942, of trust deed dated August 24th, 1933, securing £300,000 6 per cent. first mortgage redeemable debenture stock, and registered August 31st, 1933, and supplemental trust deed dated July 6th, 1939, cancelling £20,000 of the original stock remaining unissued and amending the terms of the original deed.

Edwards & Co. (Twickenham), Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated July 11th, 1942, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Receiver Released

H. S. Phillips & Co. (Electrical Engineers), Ltd.—E. A. Savage, formerly of 84–85, High Street, Weston-super-Mare, ceased to act as receiver and/or manager on April 30th, 1942. (Notice filed July 27th.)

Liquidations

Brondesbury Radio, Ltd.—Winding up voluntarily. Liquidator, Mr. A. W. Hunter, 185-188, High Holborn, London, W.C.1.

Russons, Ltd.—Particulars of claims by September 14th to the liquidator, Mr. A. T. Eaves, 47, Mosley Street, Manchester, 2.

Bankruptcies

L. C. Rowse, radio and electrical engineer, 20, Western Place, Penryn, Cornwall, formerly carrying on business at 60, Lower Market Street, Penryn.—Application for discharge to be heard on September 11th at the Town Hall, Truro.

H. W. Dinsdale, electrical engineer, 3, Clarence Road, Ipswich.—Receiving order made August 1st on debtor's own petition.

T. Maund, 37, Earle Road, Bramhall, lately trading at 80, Wellington Road North, Heaton Norris, Stockport, as an electrical engineer under the style of "Beacon Electrical Co.," now traveller for a leather goods manufacturer.—Trustee, Mr. F. H. Langmaid, Senior Official Receiver, 20, Byrom Street, Manchester, 3, released July 31st.

STOCKS AND SHARES

TUESDAY EVENING.

PRICES of Stock Exchange securities hold their ground with a firmness which can only be considered remarkable in view of the gravity of the war situation in Russia. Nor has the Russian withdrawal affected, to any noticeable extent, the volume of business. August is the quietest month of the Stock Exchange year and, for a day or two after the Bank Holiday, trade in stocks and shares certainly maintained the conventional tradition. Then business broadened out again.

Gilt-edged stocks are steady, showing no marked trend one way or the other. The strange statement by Mr. Bevin to the effect that after the war there would be no rentier class left, although traversed and contradicted by the Chancellor of the Exchequer, probably left a lingering shade of doubt in the minds of those to whom the Minister of Labour's declaration at first appeared to carry some weight. Following this, there came an unfortunate debate in the House of Commons, on an amendment proposing that the interest on Government securities should be reduced from 3 per cent. to 2 per cent. The amendment was apparently the result of a misunderstanding, but anything which threatens to undermine public confidence in the security of British Government stocks at a time like the present, is greatly to be deplored.

No Lack of Buyers

Fortunately, to-day's holder of prior-charge stocks and shares is of a type by no means likely to suffer any mental disturbance by reason of such incidents as these. The demand for 6 per cent. preference shares in the front-rank industrial companies, such as those included in the Home electricity supply list has, to some extent, slackened, as already noted here. Prices have gone back a trifle, but there are still plenty of buyers to take the shares on a bare 4 per cent. basis.

Dividends and Reports

Most of the dividends and reports which are now appearing make a good showing. It looks as though the effect of E.P.T. is tolerably well appreciated. Investment is able to estimate fairly closely what dividends will be paid by companies in the commercial category. Thorn Electrical 5s. shares are again to receive 20 per cent. for the year, and at 15s. the yield is £6 13s. 4d. per cent. Anticipation of a cheerful report from the Automatic Telephone Co. brought in buyers of the shares, with the result that the price is $\frac{1}{16}$ better at 52s. 6d. Telephone Manufacturing shares are higher at 9s. 6d. Lancashire Dynamo have risen to 70s., at which price the return comes to practically 5¾ per cent. In view of the standing of the company, this may be considered a fairly good return from such an investment. Electric & Musical shares are better at 17s.; talk has already arisen as to the possibility of an improvement upon the 6 per cent. dividend that was paid in respect of the last completed year. General Electrics hold their price at 80s. Associated Electrical ordinary at 46s. 3d. and British Aluminium at 43s. 9d. are both 6d. better. India Rubber preference strengthened to 20s.

Safety-First Shares

Amongst the front-rank preference shares on offer in the electricity supply market, it should be of service to mention 2,000 Electrical Finance and Securities 7 per cent. preference, obtainable at 32s. 6d. At this price the yield is £4 6s. 0d. per cent. Dividends are due on the 1st May and November. It takes £10,500 annually to pay the dividend on this preference issue and the amount available in the last accounts was £58,500. For the sake of comparison, Midland Electric Corporation 7 per cent. preference may be quoted as offered at 35s., paying 4 per cent; Northmet Power 4 per cent. preference at 21s. 3d. return 3¾ per cent.; and Yorkshire Electric Power sixes at 31s. x.d. give £3 17s. 3d.

Miscellaneous Movements

Control of the Telegraph Condenser Company has been duly acquired by the Telephone & General Trust. Negotiations were started early last June. The Telegraph Condenser shares taken over, were paid for at 15s. per share. The company has declared a 5 per cent. dividend for 1941, the same as that for 1940. Future developments will be watched with interest.

Cable & Wireless stocks are out of favour; the price of the ordinary and preference show small declines. Anglo-Portuguese Telephones are 6d. lower at 18s. 3d. Telephone Properties at 11s. 3d. have responded with $\frac{1}{16}$ rise to the better tone amongst most South American issues. Indian industrials have turned heavy again. Calcutta Electrics at 23s. 9d. are $\frac{1}{16}$ easier on the renewed Indian political uncertainties. At home, Northmet Power & Scottish Power are a trifle lower. British Power & Light at 27s. have shed 1s.

Brazilians

One of the trade agreements recently signed by the United States, was between that country and Brazil. It had an immediate effect in the Stock Exchange upon the prices of Brazilian Government bonds and of shares in various industrial concerns operating in Brazil. Of these last, the most popular in this country is the Brazilian Traction Co. The shares stood at 13 earlier this year; they have now risen to 17¼. The company paid dividends of 40 cents last May and 40 cents in the previous October, but it is estimated that the earnings must be running on a basis of at

(*Concluded on page* 222)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Aug. 11	Rise or Fall	Yield £ s. d.
Home Electricity Companies					
Bournemouth and Poole	12½	12½	51/3	..	4 17 6
British Power and Light	6	6	27/–	–1/–	4 9 0
City of London	7	7	27/6	..	5 1 9
Clyde Valley	8	8	40/–	..	4 0 0
County of London	8	8	36/3	..	4 8 6
Edmundson's:					
7% Pref.	7	7	34/6	..	4 1 2
Ord.	6	6	28/–	..	4 5 9
Elec. Dis. Yorkshire	9	9	42/–	..	4 5 9
Elec. Fin. and Securities	12½	12½	48/9	..	5 2 6
Elec. Supply Corporation	10	10	45/–	..	4 9 0
Isle of Thanet	2	Nil	11/3	..	—
Lancs. Light and Power	7½	7½	33/9	–9d.	4 9 0
Llanelly Elec.	5½	5½	22/6	..	4 17 9
Lond.Assoc.Electric	4½	4	19/6	..	4 2 1
London Electric	6	6	25/–	..	4 16 0
London Power Red. Deb.	5	5	105½	..	4 14 7
Metropolitan E.S.	8	8	35/-xd.	..	4 11 6
Midland Counties	8	8	38/9	..	4 2 6
Mid. Elec. Power.	9	9	42/–	..	4 5 9
Newcastle Elec.	7	7	28/9	..	4 17 5
North Eastern Elec. Ordinary	7	7	31/3	..	4 9 7
7% Pref.	7	7	34/–	..	4 2 4
Northampton	10	10	47/–	..	4 5 1
Notting Hill 6% Pref. (£10)	6	6	9	..	—
Northmet Power: Ordinary	7	7	33/9	–9d.	4 3 0
6% Pref.	6	6	31/–	..	3 17 5
Richmond Elec.	6	6	25/–	..	4 16 0
Scottish Power	8	8	38/3	–6d.	4 3 9
Southern Areas	5	5	20/–	..	5 0 0
South London	7	7	26/6	..	5 5 8
West Devon	5	5	22/6	..	4 9 0
West Glos.	4½	3½	20/–	..	3 10 0
Yorkshire Elec.	8	8	40/–	..	4 0 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	4/3	..	—
Calcutta Elec.	7*	7*	23/9	–⅛	5 18 0
Cawnpore Elec.	10	10	26/3	..	7 12 4
East African Power	7	7	27/–	..	5 3 8
Jerusalem Elec.	7	5	17/6	..	5 14 4
Kalgoorlie (10/–).	7½	5	7/6	..	6 13 4
Madras Elec.	6*	4*	18/9xd	+6d.	4 5 4
Montreal Power	1½	1½	24½	..	6 2 5
Palestine Elec."A"	Nil	4*	21/3	..	3 15 3
Perak Hydro-elec.	6	7	7/6	..	—
Shawinigan Power	83cts.	90cts.	14½	..	—
Tokyo Elec. 6%	6	6	13½	..	—
Victoria Falls Power	15	15	72/6	..	4 2 8
Whitehall Inv. Pref.	5	5	15/9	..	6 7 0

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Aug. 11	Rise or Fall	Yield £ s. d.
Public Boards					
Central Electricity:					
1950–70	5	5	109xd	..	4 11 9
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107½	..	4 3 7
1963–93	3½	3½	103½	..	3 7 8
1974–94	3¼	3¼	99½	..	3 5 4
London Elec.Trans. Ltd.	2½	2½	96	..	2 12 1
London & Home Counties 1955-75	4½	4½	109	..	4 2 7
Lond. Pass. Trans.:					
A	4½	4½	112⅜	..	4 0 0
B	5	5	114½	..	4 7 4
C	3	2⅞	45	..	6 7 8
West Midlands J.E.A. 1948–68	5	5	110	..	4 11 0
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	110	..	5 9 1
Def.	1½	1½	26	..	5 15 5
Anglo-Portuguese	8	8	18/3	–6d.	8 15 4
Cable & Wireless:					
5½ Pref.	5½	5½	103½	–½	5 6 2
Ord.	4	4	59½	–½	6 14 4
Canadian Marconi $1	Nil	4cts.	5/–	..	3 7 0
Globe Tel. & Tel.:					
Ord.	8½*	5*	27/6	..	3 12 9
Pref.	6	6	27/6	..	4 7 5
Great Northern Tel.:					
(£10)	Nil	Nil	15½	..	—
Inter. Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	28/9	..	5 4 4
Oriental Tel. Ord.	16	10	47/6	..	4 4 2
Telephone Props.	6	Nil	11/3	+⅛	—
Tele. Rentals (5/–)	10	10	9/–	..	5 11 1
Traction and Transport					
Anglo Arg. Trans.:					
First Pref. (£5)	Nil	Nil	3/–	..	—
4% Inc.	Nil	Nil	8½	..	—
Brit. Elec. Traction:					
Def. Ord.	45	45	920	..	4 17 6
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8	10	46/3xd	+6d.	4 6 4
Brazil Traction	81	50c	17½	+1½	—
Calcutta Trams	8	5½	18/3	..	6 0 9
Cape Elec. Trams	5	5	20/–	..	5 0 0
Lancs Transport	10	10	43/9	..	4 11 4
Mexican Light:					
1st Bonds	5	5	87¼xd	+1½	5 14 3
Rio 5% Bonds	5	5	101	..	4 19 0
Southern Rly:					
5% Prefd.	5	5	65	..	7 13 10
5% Pref.	5	5	106	..	4 14 6
T. Tilling	10	10	47/6	..	4 4 3
Tilling & B.A.	7*	6½*	55/–	..	2 7 3
West Riding	10	10	39/6	..	5 1 3

(*Continued on nert page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939-40	Dividend 1940-41	Middle Price Aug. 11	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord. ..	Nil	7½	25/–	..	6 0 0
Assoc. Elec. :					
Ord.	10	10	46/3	+6d.	4 6 6
Pref.	8	8	39/6	..	4 1 0
Automatic Tel.&El.	12½	12½	52/6	+⅛	4 15 3
Babcock & Wilcox	11	11	42/6	+6d.	5 3 6
British Aluminium	10	10	43/9	+6d.	4 11 6
British Insul. Ord.	20	20	93/9	..	4 5 6
British Thermostat (5/–)	18½	18½	16/3	..	5 13 10
British Vac. Cleaner (5/–)	12½	10	13/9	..	3 12 9
Brush Ord. (5/–) ..	Nil	6	6/–	..	5 0 0
Callender's ..	15	15	72/6	..	4 2 9
ChlorideElec.Storage	15	15	72/6	..	4 2 9
Cole, E. K. (5/–) ..	Nil	7	14/–	..	2 10 0
Consolidated Signal	17	17	70/–	–¼	4 17 2
Crabtree (10/–) ..	17½	17½	30/–	..	5 16 8
Crompton Parkinson Ord. (5/–) ..	30	20	21/3	..	4 14 0
E.M.I. (10/–) ..	Nil	6	17/–	+3d.	3 10 10
Electric Construction	10	10	34/6	..	5 16 0
Enfield Cable Ord.	12½	12½	53/9	..	4 13 0
Elecl. Switchgear (10/–)	10	10	20/–	..	5 0 0
English Electric ..	10	10	41/3	..	4 17 0
Ensign Lamps (5/–)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/–)	22*	20*	40/–	–⅛	2 10 0
Ever Ready (5/–)	40	40	32/3	..	6 4 0
Falk Stadelmann	7	7½	23/9	..	6 6 4
Ferranti Pref. ..	7	7	27/6	..	5 1 10
G.E.C. :					
Pref.	6½	6½	33/9	..	3 17 0
Ord.	20	17½	80/–	..	4 7 6
Greenwood & Batley	15	15	30/–	..	10 0 0
Hall Telephone(10/–)	10	12½	20/–	..	6 5 0
Henley's (5/–) ..	20	20	22/6	..	4 9 1
4½% Pref. ..	4½	4½	22/6	..	4 0 0
Hopkinsons ..	15	15	50/–	..	6 0 0
India Rubber Pref.	5½	5½	20/–	+⅛	5 10 0
Intl. Combustion..	32½	30	107/6	..	5 12 0
Johnson & Phillips	15	15	60/–	..	5 0 0
Lancashire Dynamo	20	20	70/–	+⅛	5 14 4
Laurence, Scott (5/–)	15	12½	9/6	..	6 11 7
London Elec. Wire	7½	7½	28/3	..	5 6 2
Lucas, J.	15	15	66/3	..	4 10 8
Mather & Platt ..	10	10	41/3	..	4 17 0
Met.Elec.Cable Pref.	5½	5½	21/3	..	5 3 6
Murex	20	20	97/6	..	4 2 0
Pye Deferred (5/–)	25	25	16/3	..	7 13 10
Revo (10/–) ..	20	17½	28/9	..	6 1 9
Reyrolle	12½	12½	58/9	..	4 5 0
Siemens Ord. ..	7½	7½	26/3	..	5 14 3
Smith, S. (1/–) ..	50	37½	7/–	..	5 7 2
Strand Elec. (5/–)	2	4	4/6	..	4 9 0
Switchgear & Cowans (5/–) ..	15	10	10/–	..	5 0 0
T.C.C. (10/–) ..	5	5	15/–xd	+3d.	3 6 8
T.C. & M... ..	10	10	43/9	..	4 11 4
Telephone Mfg.(5/–)	9	9	9/6	+3d.	4 14 9
Thorn Elec. (5/–)	20	20	15/–	..	6 13 4
Tube Investments	23½	20	85/–	..	4 14 1
Vactric (5/–) ..	Nil	Nil	6/–	..	—
Vickers (10/–) ..	10	10	16/6	–3d.	6 1 3
Ward & Goldstone (5/–)	20	20	19/–	..	5 5 3
Westinghouse Brake	10	10	47/6	..	4 4 2
Walsall Conduits(4/–)	55	55	36/3	..	6 4 6
West, Allen (5/–)	7½	7½	5/9	..	6 10 5

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 220)

least $2 per share per annum. Some years ago, when the earnings were less than this, the shares rose to over 31, and bullishness is discussing the probability of the price going over 20, in view of the present favourable conditions affecting the company. The new agreement with America will enable money to be remitted from the country and the prospect is considered favourable for speculative investment.

Para Electric

Another Brazilian company which is being observed with attention is the Para Electric Railways and Lighting Co. It owns the tramway and electric lighting undertakings of a company, registered in Para, whose concessions run for 99 years from 1905. After this, the undertaking becomes the property of the Municipality, without payment. The company's 6 per cent. first debenture, standing at 36, attracts notice. From December 1st, 1936, to June 1st, 1940, inclusive, dividends of 2½ per cent. per annum were paid. A moratorium established in 1931 and reaffirmed in 1936, modified the 6 per cent. interest, but after June 1st, 1941, interest at the full rate of 6 per cent. per annum was to be payable, irrespective of profits. The company was unable to implement the arrangement, but in view of the changed conditions in Brazil, speculation is suggesting that the company may be able, before long, to raise the 2½ per cent. interest to something more nearly approaching the 6 per cent. to which the debenture holders are entitled.

Mexico

Among the countries which stand to benefit by a trade agreement with the United States is Mexico. For some time past, as noted here, Mexico Tramway issues have been advancing in price, the mortgage bonds having risen substantially during the present year. Mexico, like Brazil, supplies certain of the commodities and metals that are urgently required for war production, and with the country freed, at any rate for the time being, from financial stress, Mexican industrial concerns are expected to do well. Mexican Light & Power 5 per cent. first mortgage bonds have regained the half yearly interest deducted from the price last week, and at 87½ give a yield of nearly 5¾ per cent.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *can be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1939

29471. "Illuminating devices providing polarised light." A. M. Marks. November 6th, 1939. (Convention date not granted.) (546553.)

1940

9776. "Sound-recording." Radio Corporation of America. June 24th, 1939. (Cognate applications, 9777/40 and 9778/40). (546554.)

15953. "Cathode-ray tube television apparatus." Ges. zur Forderung der Forschung auf dem Gebiete der Technischen Physik an der Eidgenossischen Technischen Hochschule. May 22nd, 1940. (Addition to 543485.) (546462.)

16538. "Gaseous electric-discharge devices." G. R. Shepherd (Westinghouse Electric International Co.). November 15th, 1940. (546455.)

17374. "Method and apparatus for measuring electrical impedances." Standard Telephones & Cables, Ltd., and B. Secker. December 6th, 1940. (546466.)

17474. "Electric ratio-meters." S. Smith & Sons (Motor Accessories), Ltd., and E. C. Klepp. December 9th, 1940. (546468.)

1941

434. "Television." J. L. Baird. January 13th, 1941. (546470.)

460. "Light buoys." Firestone Tire & Rubber Co. January 13th, 1940. (546533.)

474. "Control system for electric valve apparatus." British Thomson-Houston Co., Ltd. January 11th, 1940. (546558.)

521. "Dynamo-electric machines." British Thomson-Houston Co., Ltd., and L. Griffiths. January 14th, 1941. (546473.)

526. "Electrodes for electric-discharge tubes, especially for maintaining a voltage constant." Marconi's Wireless Telegraph Co., Ltd., and C. P. Fagan. January 14th, 1941. (546475.)

529. "Quarter-wave networks." Marconi's Wireless Telegraph Co., Ltd., A. T. Starr and E. Green. January 14th, 1941. (546476.)

594. "Homopolar alternators." British Thomson-Houston Co., Ltd., J. H. Walker and B. Adkins. January 16th, 1941. (546536.)

618. "Electric transformers and inductances." W. E. Simmons, and H. M. Harmer. January 16th, 1941. (546539.)

653. "Electro-acoustic translating method and means." Standard Telephones & Cables, Ltd. January 23rd, 1940. (546478.)

1684. "Clothes wringers." British Thomson-Houston Co., Ltd. February 7th, 1940. (546542.)

2290. "Electrical switchgear and contact arrangements therefor." R. Clarke and G. J. Scott. February 19th, 1941. (546435.)

2393. "Vacuum electric-discharge devices." British Thomson-Houston Co., Ltd. February 21st, 1941. (546543.)

2464. "Electric heaters." M. Lossos and M. & J. Lossos & Co., Ltd. February 24th, 1941. (546544.)

2573. "Electrical relay arrangements." Switchgear & Cowans, Ltd., and A. V. Maxwell. February 25th, 1941. (546546.)

3084. "Preservation of wood." Electrical Research Products, Inc. March 13th, 1940. (546436.)

3100. "Electro-magnetic induction apparatus and methods and apparatus for producing the same." British Thomson-Houston Co., Ltd. March 9th, 1940. (546548.)

3355. "Tap-changing circuits for electric transformers. British Thomson-Houston Co., Ltd. March 14th, 1940. (546437.)

3501. "Elastic-fluid turbines." Westinghouse Electric International Co. March 19th, 1940. (546503.)

3506. "Gaseous electric glow discharge thermal switches." G. R. Shepherd (Westinghouse Electric International Co.) March 14th, 1941. (546550.)

3870. "Arrangement for the reception of ultra-short radio waves." S. R. R. Kharbanda, M. C. Goodall and Pye, Ltd. March 21st, 1941. (546505.)

3898. "Cathode-ray tube circuits." Philco Radio & Television Corporation. March 21st, 1940. (546507.)

4041. "Method of, and apparatus for, determining the out-of-balance of rotors." R. N. Arnold and Metropolitan-Vickers Electrical Co., Ltd. March 26th, 1941. (546509.)

4306. "Electric valve circuits for interchanging power between alternating and direct current circuits." British Thomson-Houston Co., Ltd. March 30th, 1940. (546439.)

4722. "Vapour electric-discharge devices." Westinghouse Electric International Co. April 24th, 1940. (546571.)

5649. "Trough reflector fittings for discharge lamps." Edison Swan Electric Co., Ltd., and F. M. Cocksedge. May 1st, 1941. (546442.)

5835. "Operating-mechanism for mechanical brakes." J. W. Davison and Metropolitan-Vickers Electrical Co., Ltd. May 5th, 1941. (546574.)

6289. "Cathode-ray tubes of the television transmitting type." Marconi's Wireless Telegraph Co., Ltd. May 15th, 1940. (546519.)

6929. "Motor-operated step-by-step electric switches." Landis & Gyr. Soc. Anon. April 26th, 1940. (Addition to 434564 and 443417.) (546577.)

9635. "Electro-magnetic switches." Igranic Electric Co., Ltd. August 1st, 1940. (546582.)

9655/6. "Electric-discharge tubes." Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken). July 29th, 1941. (546583/4.)

10080. "Electron-discharge devices." Standard Telephones & Cables, Ltd. August 24th, 1940. (546586.)

Amended Specification

527,902. "Frequency-selective circuit arrangements." Marconi's Wireless Telegraph Co., Ltd. and others.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—TOWNSVILLE (QUEENSLAND). — November 19th. City Council. Water-tube boiler of not less than 36,000 lb per hr. evaporative capacity at a pressure of 200 lb per sq. in. Specifications (£1 1s.) from A. Robertson, Town Clerk.

East Riding.—August 31st. County Education Committee. Electric lighting and heating installations in 40 air-raid shelters. Specifications from county architect, County Hall, Beverley. Tenders to Clerk of Council.

Normanton.—August 31st. Urban District Council. One 2-ton electric vehicle complete with battery charger (July 31st.).

Orders Placed

Australia.—VICTORIA.—State Electricity Commission. Accepted. 66-kV outdoor switchgear and accessories (£16,084).—A. Reyrolle & Co., Ltd.

Belfast.—Electricity Committee. Accepted. Electrically driven centrifugal feed water pump (£785).—Mather & Platt.

Cheltenham. — Electricity Committee. Accepted. Cables for twelve months: High-voltage.—Hackbridge Cable Co. Low-voltage. —Aberdare Cable Co.

Liverpool.—Electric Power and Lighting Committee. Accepted. One 10,000-kVA, 6/22-kV transformer (£4,850).—Metropolitan-Vickers. 33-kV cable (£7,281).—B.I. Cables.

London.—ST. PANCRAS.—Contract and Libraries Committee. Accepted. Cables for one year.—Metropolitan Electric Cable & Construction Co., Standard Telephones & Cables. Electric vehicle battery (£179).—Britannia Batteries.

Sheffield.—Electricity Committee. Accepted. Cables (£50,852).—W. T. Glover & Co.

Southport.—Health Committee. Accepted. Electric lighting and heating at hospital huts (£114).—F. W. Smith & Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Berwick-on-Tweed.—Adaptation of Ava Lodge as hostel for Northern Counties Training College of Cookery; Northumberland county architect, County Offices, Morpeth.

Bournemouth. — Maternity home, Meyrick Park Crescent; Meyrick House, Ltd.

Additions to Royal Victoria Hospital (£3,000); Governors.

Cheshire.—First-aid party depot and child welfare centre, Sandbach (£2,500); E. M. Parkes, county architect, The Castle, Chester.

Coventry.—Residential nursery; D. E. E. Gibson, city architect, 1a, Warwick Row.

Derbyshire.—School premises, Duckmanton; J. Harrison, county architect, County Offices, St. Mary's Gate, Derby.

Dewsbury.—Extensions to Council School, Batley Carr, for nursery classes; M. H. Forward, borough architect, Town Hall.

Earlestown.—Bus station; Lancashire United Transport & Power Co., Ltd., Atherton.

Harrow.—Conversion of Whitchurch Institute into British Restaurant (£1,655), and additions and alterations at 76, Marlborough Hill (£900); surveyor, Council Offices, Uxbridge Road, Stanmore.

Keresley.—Additional wards (£20,000); secretary, Coventry and Warwickshire Hospital, Coventry.

Lancaster.—Day nursery, Ryelands Park (£2,476); A. O. Thoms, builder, Wheatfield Street, Lancaster.

Liverpool.—Four canteens (£11,700) and extension of two others (£2,250); Mersey Docks and Harbour Board.

Manchester. — Day nursery, Moss Side (£1,870); Russell Building & Contracting Co., Ltd., 165, Plymouth Grove, Chorlton-on-Medlock.

Newcastle-on-Tyne.—Air-raid shelters at Heaton Baths; J. O. C. Solomon, estate and property surveyor, Town Hall.

Rhyl.—Alterations at Market Hall for feeding centre (£2,639); surveyor, Council Offices, Clwydd Street.

Romford. — Day nursery, Rush Green; borough engineer, Town Hall.

Salford.—Five 50-person surface shelters, Weaste; W. A. Walker, city engineer, Town Hall.

Shildon.—Skating rink (£600); F. Turnbull, surveyor, U.D.C. Offices.

Sunderland.—Reconstruction of stores, Fawcett Street; W. and T. R. Milburn, architects, 17, Fawcett Street, Sunderland.

Pump house; W. A. Royle, borough electrical engineer.

Women's rest rooms and tackle and riggers' stores at shipyards; D. & J. Ranken, Ltd., builders, Stockton Road.

Garage for haulage waggons; J. Prentice, St. Nicholas Avenue.

School hut, Plains Farm Estate; O. H. Mark, Education Offices, Tatem Street.

Watford.—Cleansing station and restaurant; borough engineer.

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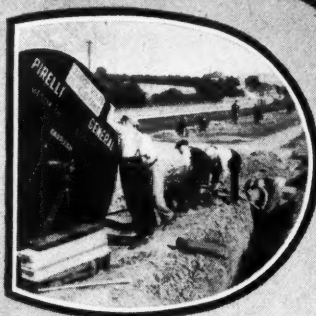

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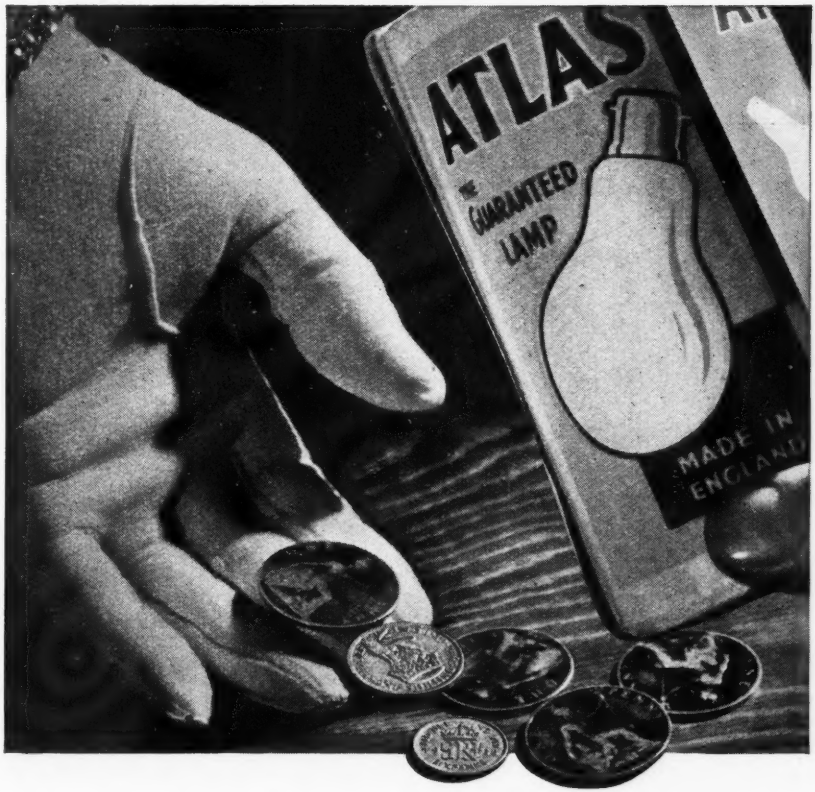

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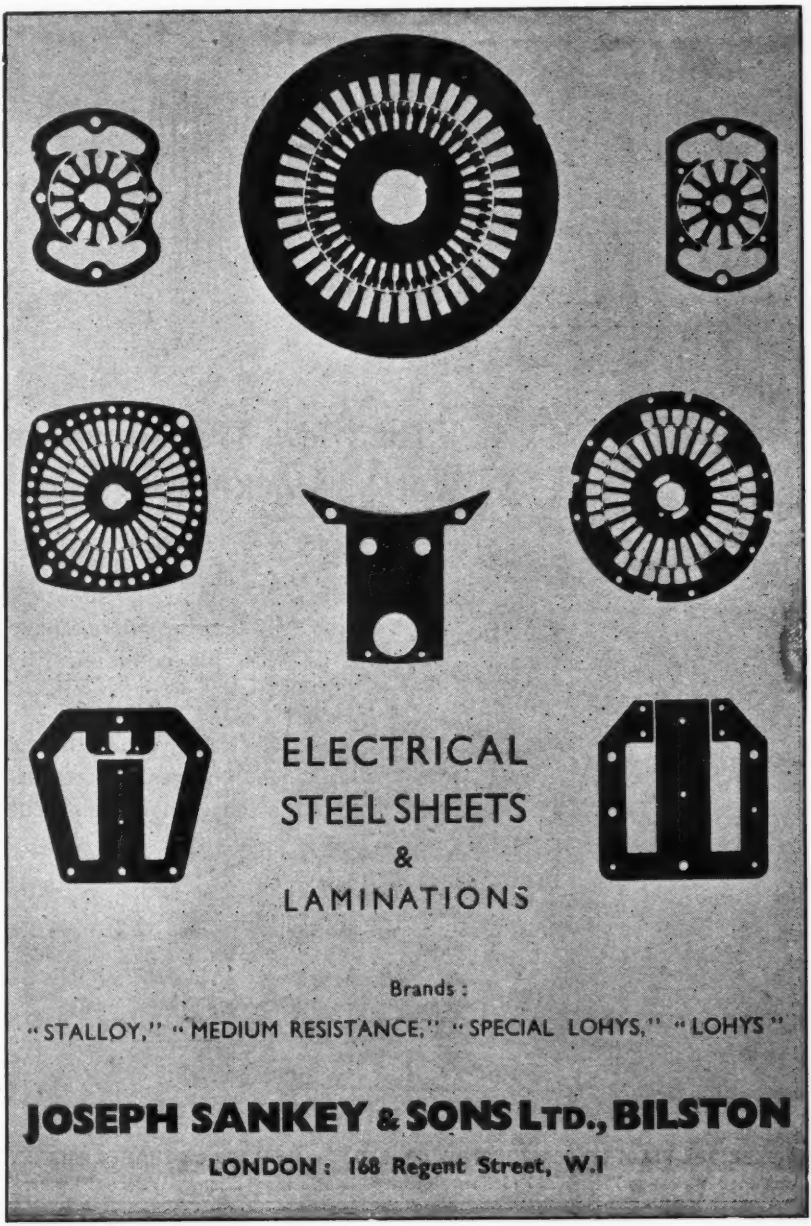
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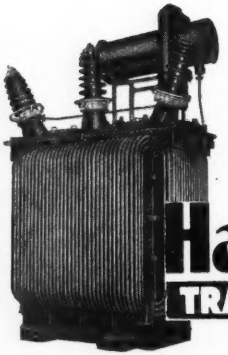

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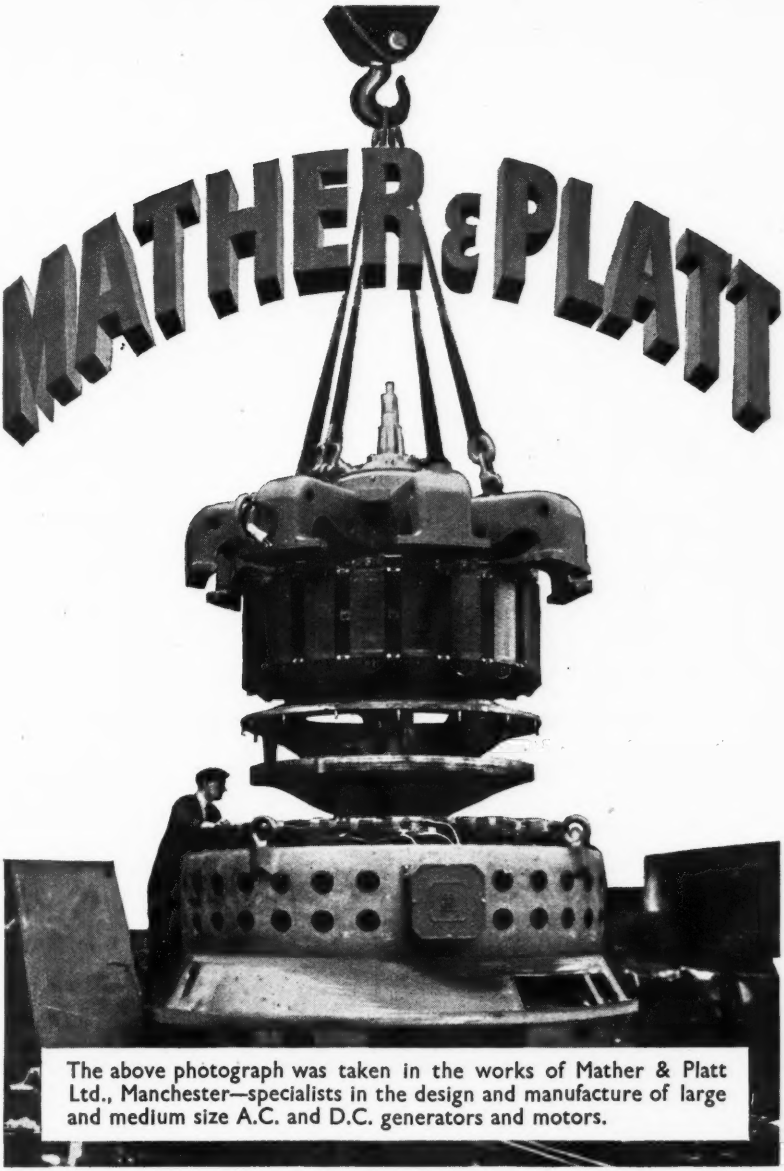

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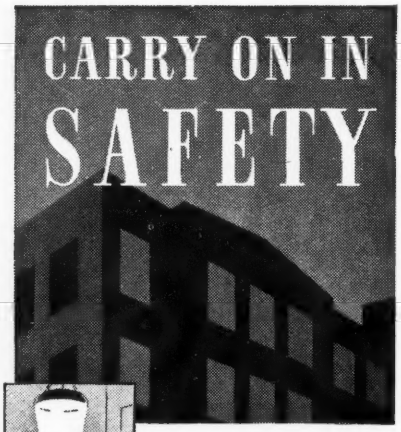

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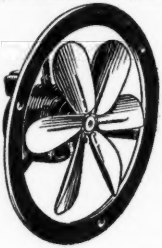

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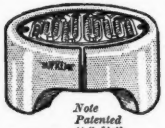

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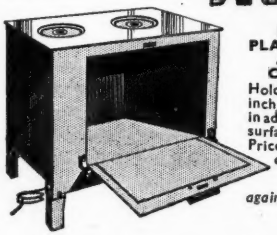

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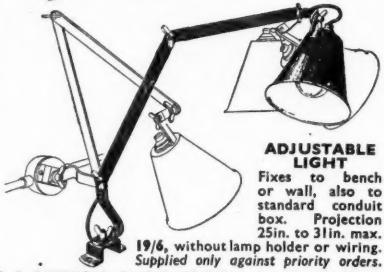

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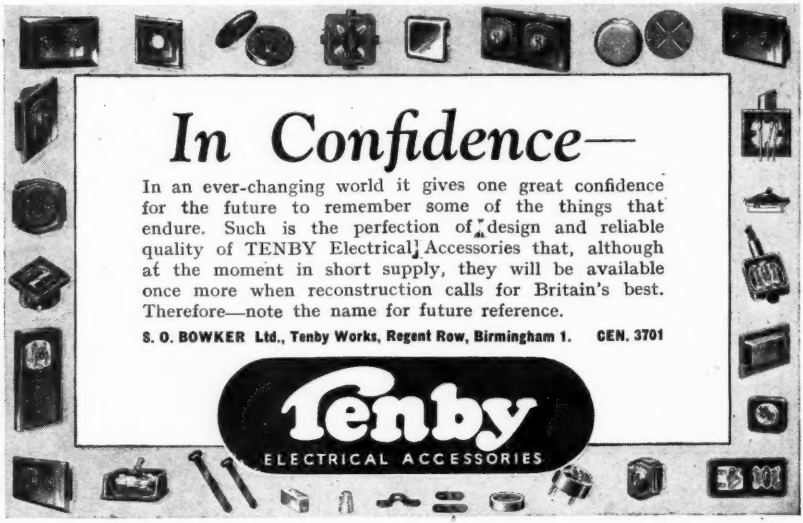

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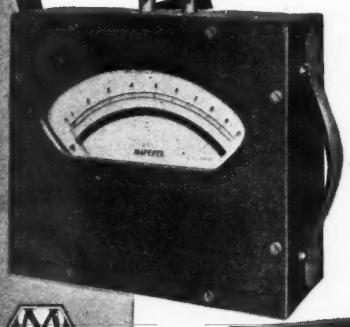

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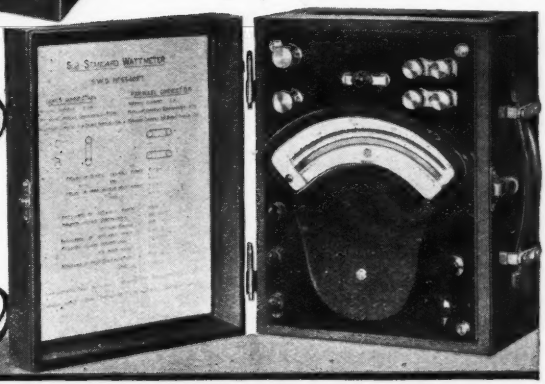

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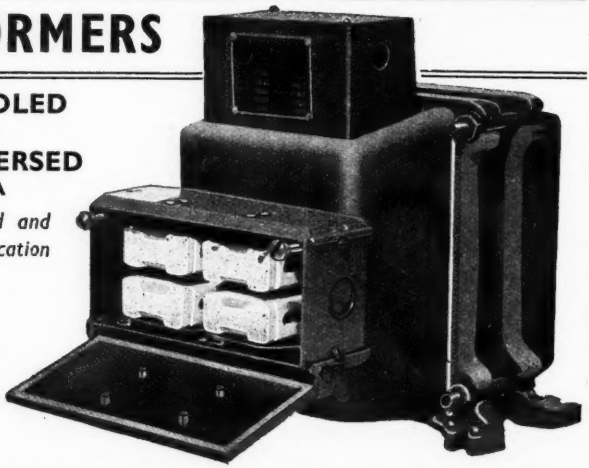

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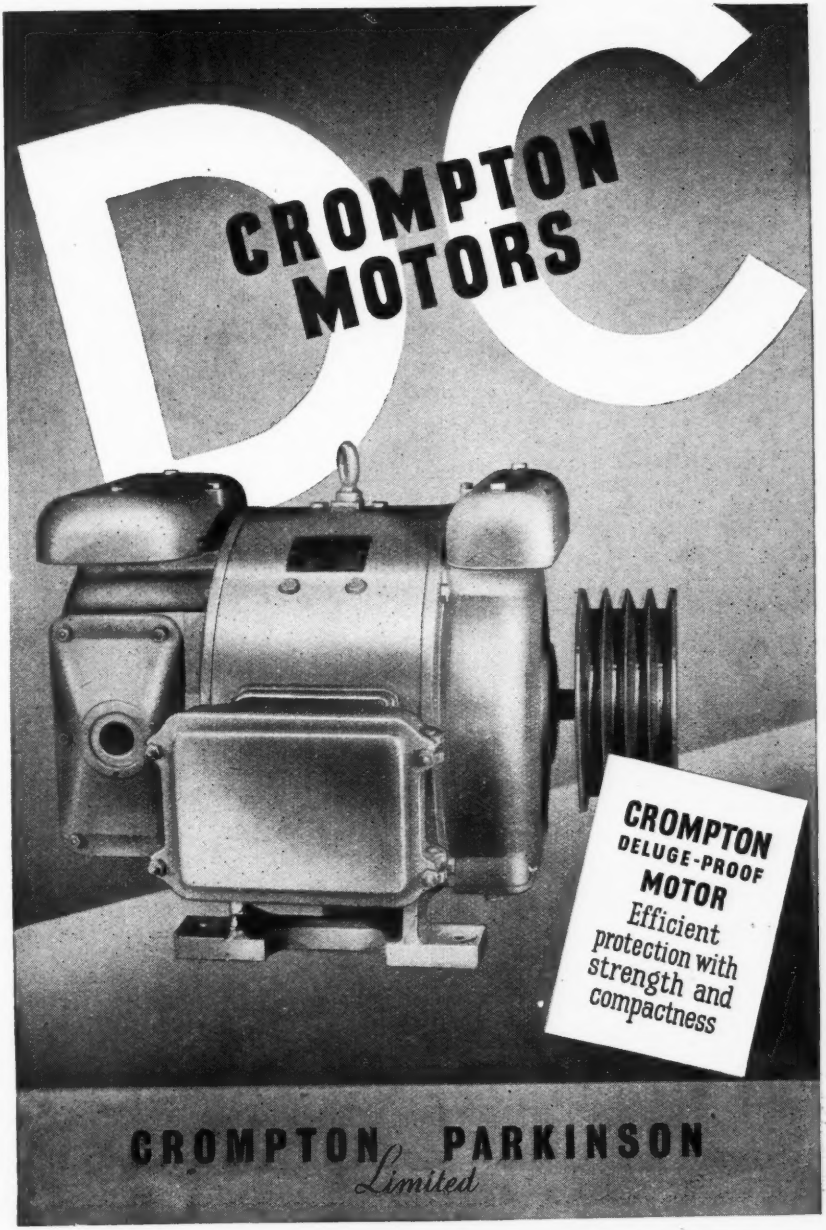
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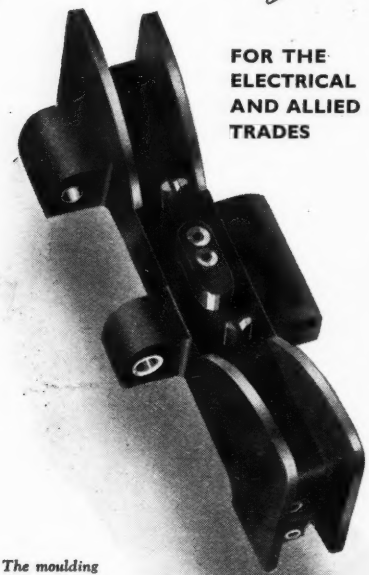

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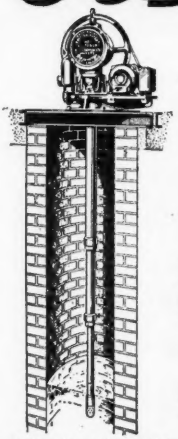

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